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NAVAL PROFESSIONAL PAPERS

No. 19

THE VARIATION OF THE COMPASS

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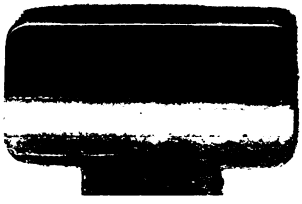

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NAVAL PROFESSIONAL PAPERS: No. 19.

THE

Variation of the Compass,

as determined in various parts of the World (chiefly at Sea), by Officers of the United States Navy, while Navigators of Ships, between the Years 1881 and 1885.

BUREAU OF NAVIGATION,

NAVY DEPARTMENT.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1886.

PREFACE.

The observations of the variation of the compass in this volume have been made in different parts of the world by officers of the U. S. Navy while Navigators of vessels, and extend through a period of four years—since 1881.

Every care has been taken to insure their accuracy and trustworthiness; the instruments used (the compass and azimuth circle) have been tested and inspected before being issued to ships; the Form of Report was devised with the special view of affording all the information possible that would conduce to a correct judgment of the character of the observations; the examination of the observations and their compilation in the Office of Superintendent of Compasses have been done with the sole object of excluding error and giving data of the closest approximation to the truth.

Only those observations which bore the evidence of care on the part of observers, and had circumstances favorable to accuracy, are published. In every instance the character of the original observation is still dependent upon the observer, and he is responsible for it; the Bureau only undertakes to select (in its opinion) the best, and have them correctly compiled.

As, in the original observation, the Variation of the locality and the Deviation proper to the course the ship was heading are combined, in order to obtain the Variation correctly, it became necessary to know the Deviation accurately; and, to this end, the vessel was turned in a circle at frequent intervals during the voyage, and new Tables of Deviation obtained in the manner required by the Report. A sample of the Report is bound in the back of this book. The case of the U. S. S. Pensacola, Captain Henry Erben, will illustrate the whole. This ship, being on the West Coast of South America, received orders to return home *via* the Cape of Good Hope. During her passage around the world, in compliance with specific instructions from the Bureau, an excellent series of observations for Variation was obtained, and Tables of Deviation were determined previous to sailing and *en route* as follows:

Dec. 14, 1882, off Callao, Peru; Jan. 17, 1883, at sea in Lat. 1° 36′ N. and Long. 80° 53′ W.; April 11, 1883, off Coquimbo, Chili, Lat. 29° 55′ S., Long. 71° 19′ W.; July 24, 1883, at sea in Lat. 7° 26′ S., Long. 107° 38′ W.; Aug. 9, 1883, at sea in Lat. 12° 29′ N., Long. 136° 02′ W.; Aug. 19, 1883, off Honolulu in Lat. 21° 10′ N., Long. 157° 54′ W.; Sept. 16, 1883, at sea in Lat. 20° 03′ N., Long. 174° 34′ E.; Oct. 23, 1883, off the coast of Japan in Lat. 34° 42′ N., Long. 139° 10′ E.; Dec. 9, 1883, off Singapore in Lat. 1° 16′ N., Long. 104° 16′ E.; March 7, 1884, off Cape of Good Hope in Lat. 33° 40′ S., Long. 17° 39′ E.; April 2, 1884, at sea in Lat. 7° 45′ S., Long. 19° 20′ W.; April 25, 1884, at sea in Lat. 17° 0′ N., Long. 59° 31′ W.; and lastly, May 10, 1884, just before entering Chesapeake Bay, in Lat. 36° 54′ N., Long. 75° 45′ W.

With all these Tables of Deviations before the compiler, it is evident that he has the fullest and most accurate information possible for correctly estimating the devi-

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ation to be applied to any compass error determined *en route*, in order to separate the Deviation from the Variation. And such was the case with every vessel whose observations are given herein. In addition, the vessels being wooden, in which the deviations were always small and changed but little, there was an additional source of accuracy in the results.

The variations obtained from the observations made to determine a Table of Deviations are unquestionably reliable—probably the closest approximations that can be had. They are printed in heavy-faced type to distinguish them, and while the others resulting from an observation on a single course are not considered final, still they are deemed highly trustworthy on account of the great care exercised in the various processes to reach them.

All are published that immediate use may be made of them, and such is intended to be the practice from time to time, until a sufficient number are accumulated for the final revision and publication of a Variation Chart of the World.

In the present volume the Variations are arranged in zones of five degrees of latitude, without reference to longitude.

As the present endeavor to systematize and publish the observations for the Variation of the Compass has proved so satisfactory and successful during the past four years, it is hoped that the results obtained will have the effect of causing Commanding Officers to select opportunities, and to encourage navigators to continue the observations in future.

BUREAU OF NAVIGATION,

NAVY DEPARTMENT, WASHINGTON,

July 22, 1885

The Variation of the Compass.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 1, 1883	0° 00′	30° 59′ W.	14° 07′ W.
Sept. 3, 1883	0 00	105 09 E.	2 01 E.
Aug. 2, 1883	0 01	127 57 W.	5 52 E.
Aug. 16, 1883	**0 04**	**73 52 E.**	**0 38 W.** *a*
Dec. 4, 1884	0 06	29 46 W.	15 12 W.
Feb. 17, 1883	0 08	26 05 W.	19 07 W.
Jan. 18, 1883	0 12	80 53 W.	6 32 E.
June 2, 1883	0 36	131 42 W.	7 54 E.
March 13, 1885	0 44	80 21 W.	6 24 E.
Aug. 1, 1883	0 51	31 04 W.	15 29 W.
May 25, 1884	1 07	57 45 E.	2 21 W.
Dec. 9, 1883	**1 16**	**104 16 E.**	**2 27 E.** *a*
June 3, 1883	1 20	132 43 W.	7 32 E.
Aug. 3, 1883	1 28	128 48 W.	6 09 E.
Jan. 17, 1883	**1 36**	**80 53 W.**	**5 33 E.** *b*
March 14, 1885	1 44	79 43 W.	6 30 E.
Dec. 5, 1884	2 0	30 46 W.	14 32 W.
May 26, 1884	2 09	57 09 E.	2 52 W.
Jan. 17, 1883	2 11	80 55 W.	5 43 E.
Aug. 3, 1883	2 15	129 27 W.	6 03 E.
April 11, 1884	2 39	35 25 W.	13 59 W.
April 25, 1884	2 51	105 05 E.	3 26 E.
Dec. 5, 1884	2 59	31 10 W.	13 31 W.

a = Mean of observations on 16 equidistant points.
b = " " " " 8 " "
6

From the Equator to 5° North.

(4) Name of ship.	(5) Name of observer.	(6) Computed by—
U. S. S. Galena	Lt. H. W. Lyon	Lt. Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" **Enterprise**	" **G. A. Norris**	" **G. A. Norris.**
" Essex	" W. Kellogg	" Scott.
" Enterprise	" G. A. Norris	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Wachusett	" B. S. Richards	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Richmond	Lt. Comd'r Houston	" Diehl.
" **Pensacola**	**Lt. F. Hanford**	" **F. Hanford.**
" Essex	" W. H. Parker	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" **Pensacola**	" **F. Hanford**	" **Diehl.**
" Wachusett	" B. S. Richards	" Scott.
" Essex	" W. Kellogg	" Scott.
" Richmond	Lt. Comd'r Houston	" Diehl.
" Pensacola	Lt. F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Trenton	" A. Walker	" Diehl.
" Essex	" W. Kellogg	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 4, 1883	3° 00′	134° 09′ W.	7° 45′ E.
April 17, 1884	**3 02**	**105 08 E.**	**4 32 E.** *b*
Feb. 15, 1883	**3 30**	**24 42 W.**	**19 02 W.** *a*
Aug. 4, 1883	3 40	130 24 W.	5 44 E.
April 17, 1884	3 45	105 28 E.	3 53 E.
Feb. 15, 1883	**3 51**	**24 39 W.**	**19 03 W.** *b*
March 15, 1885	3 54	79 16 W.	5 08 E.
May 27, 1884	3 58	55 36 E.	2 37 W.
Sept. 5, 1884	4 20	105 36 E.	3 12 E.
Aug. 28, 1883	4 31	100 0 E.	1 55 E.
Aug. 3, 1883	4 50	30 30 W.	16 41 W.
Dec. 6, 1884	4 52	32 14 W.	13 36 W.
April 12, 1884	4 54	37 21 W.	12 44 W.

a = Mean of observations on 4 equidistant points.

b = " " " " 16 " "

From the Equator to 5° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. Diehl.
" **Richmond**	**Lt. Com. E. S. Houston**	" **Hubbard.**
" **Enterprise**	**Lt. G. A. Norris**	" **G. A. Norris.**
" Pensacola	" F. Hanford	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" **Enterprise**	**Lt. G. A. Norris**	" **G. A. Norris.**
" Wachusett	" B. S. Richards	" Scott.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Scott.
" Juniata	" E. H. C. Leutze	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Pensacola	" F. Hanford	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 5, 1883	5° 00′	134° 56′ W.	7° 39′ E.
Aug. 5, 1883	5 25	130 50 W.	6 09 E.
Aug. 3, 1883	5 28	30 19 W.	17 25 W.
May 28, 1884	5 32	53 54 E.	2 52 W.
Feb. 14, 1883	5 45	24 24 W.	17 53 W.
April 13, 1884	5 45	81 45 E.	0 11 E.
April 16, 1884	5 45	92 22 E.	0 46 W.
April 15, 1884	5 48	89 36 E.	0 14 W.
April 14, 1884	5 52	85 29 E.	0 02 E.
April 26, 1884	5 55	106 52 E.	3 03 E.
April 16, 1884	5 55	169 30 E.	7 49 E.
Aug. 5, 1883	6 00	131 02 W.	5 33 E.
March 16, 1885	6 02	78 45 W.	6 00 E.
April 13, 1884	6 27	39 38 W.	11 30 W.
Oct. 4, 1883	6 44	107 12 E.	2 59 E.
Aug. 4, 1883	6 54	29 54 W.	17 03 W.
April 20, 1884	7 00	168 11 E.	9 26 E.
March 29, 1885	**7 10**	**80 00 W.**	**4 40 E.** *a*
Jan. 14, 1883	7 16	79 45 W.	4 24 E.
June 12, 1883	7 23	78 27 E.	1 52 E.
June 6, 1883	7 28	135 37 W.	7 47 E.
April 14, 1884	7 30	166 54 E.	8 55 E.
Dec. 7, 1884	7 40	33 38 W.	13 32 W.

a = Mean of observations on 8 equidistant points.

From 5° North to 10° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. Scott.
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Enterprise	Lt. G. A. Norris	" Hubbard.
" Trenton	" Asa Walker	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Wachusett	" B. S. Richards	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Enterprise	" G. A. Norris	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Wachusett	" B. S. Richards	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Essex	" W. H. Parker	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Feb. 13, 1883	7° 48′	24° 16′ W.	18° 30′ W.
June 24, 1883	7 50	81 54 E.	1 27 E.
April 14, 1884	7 51	41 32 W.	10 31 W.
April 21, 1884	7 57	166 12 E.	9 40 E.
Sept. 4, 1884	8 02	107 38 E.	2 36 E.
Aug. 7, 1883	8 09	132 35 W.	6 20 E.
Aug. 5, 1883	8 36	30 03 W.	17 47 W.
April 15, 1884	8 46	107 46 E.	4 28 E.
April 22, 1884	8 58	164 40 E.	7 48 E.
April 27, 1884	9 00	108 53 E.	3 23 E.
April 6, 1884	9 11	76 18 E.	0 16 W.
March 20, 1884	9 22	79 54 W.	5 23 E.
May 30, 1884	9 32	51 33 E.	2 33 W.
Sept. 3, 1884	9 34	108 40 E.	2 26 E.

From 5° North to 10° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Enterprise	Lt. G. A. Norris	Lt. Hubbard.
" Juniata	" E. H. C. Leutze	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Essex	" W. H. Parker	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 12, 1885	**10° 06′**	**78° 23′ W.**	**4° 34′ E.** *a*
Feb. 12, 1883	10 11	23 55 W.	19 00 W.
Feb. 25, 1883	10 15	79 18 W.	3 56 E.
Aug. 6, 1883	10 20	30 35 W.	16 59 W.
March 15, 1884	**10 20**	**75 31 W.**	**4 12 E.** *b*
July 1, 1883	10 23	80 33 E.	1 48 E.
March 9, 1884	10 25	75 32 W.	4 07 E.
April 16, 1884	10 32	46 19 W.	8 30 W.
Jan. 3, 1885	**10 33**	**61 49 W.**	**0 44 E.** *c*
Jan. 30, 1884	10 37	66 57 W.	2 44 E.
Aug. 8, 1883	10 38	134 13 W.	6 05 E.
Jan. 22, 1884	10 39	61 44 W.	0 47 E.
April 14, 1884	10 42	110 22 E.	4 48 E.
April 23, 1884	10 43	163 58 E.	7 32 E.
Aug. 17, 1883	10 44	94 49 E.	1 43 E.
Dec. 8, 1884	10 45	36 00 W.	14 06 W.
June 8, 1883	10 47	137 30 W.	7 20 E.
March 3, 1884	11 00	74 58 W.	3 58 E.
Jan. 24, 1884	11 06	66 07 W.	2 54 E.
Aug. 6, 1883	11 08	30 50 W.	16 23 W.
Feb. 2, 1884	11 13	67 26 W.	1 32 E.
March 1, 1884	11 15	74 14 W.	4 13 E.
April 23, 1884	11 18	163 58 E.	7 39 E.

a = Mean of observations on 8 equidistant points.

b = Determined by observations on shore.

c = Mean of observations on 12 equidistant points.

From 10° North to 15° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Tennessee	**Lt. S. W. Very**	**Lt. S. W. Very.**
" Enterprise	" G. A. Norris	" Hubbard.
" Vandalia	" C. Belknap	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" **Vandalia**	" **C. Belknap**	" **C. Belknap.**
" Juniata	" E. H. C. Leutze	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" **Swatara**	" **R. B. Peck**	" **R. B. Peck.**
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Essex	" W. H. Parker	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Essex	" W. H. Parker	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 7, 1883	11° 24′	31° 15′ W.	16° 28′ W.
Jan. 24, 1884	11 25	65 48 W.	1 31 E.
Sept. 30, 1883	11 28	111 09 E.	2 35 E.
April 17, 1884	11 33	48 49 W.	7 27 W.
Feb. 29, 1884	11 36	74 08 W.	4 49 E.
Jan. 23, 1884	11 43	63 19 W.	1 02 E.
June 10, 1883	11 43	74 31 E.	0 33 E.
July 10, 1883	**11 53**	**79 52 E.**	**0 03 W.** *a*
April 28, 1884	11 59	110 40 E.	2 48 E.
June 9, 1883	12 00	139 40 W.	7 36 E.
Jan. 3, 1884	12 00	61 11 W.	0 13 E.
Feb. 28, 1884	12 01	73 13 W.	3 39 E.
Feb. 24, 1883	12 06	77 15 W.	2 14 E.
Feb. 23, 1884	12 07	68 57 W.	2 00 E.
April 18, 1884	12 12	51 16 W.	5 17 W.
Feb. 26, 1884	12 16	69 15 W.	2 39 E.
March 23, 1884	12 23	80 24 W.	5 12 E.
June 2, 1884	**12 27**	**46 40 E.**	**3 50 W.** *a*
Aug. 9, 1883	**12 29**	**136 02 W.**	**6 29 E.** *b*
June 9, 1883	12 30	140 25 W.	7 36 E.
April 20, 1884	12 37	54 35 W.	3 23 W.
Dec. 9, 1884	12 41	38 39 W.	14 20 W.
Aug. 16, 1883	12 42	94 01 E.	2 14 E.

16

a = Mean of observations on 8 equidistant points.

b = " " " " 16 " "

From 10° North to 15° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Galena	Lt. H. W. Lyon	Lt. Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" **Juniata**	" **E. H. C. Leutze**	" **Diehl.**
" Trenton	" Asa Walker	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" **Richmond**	**Lt. Com. E. S. Houston**	**Lt. Com. Houston.**
" **Pensacola**	**Lt. F. Hanford**	**Lt. Diehl.**
" Essex	" W. H. Parker	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Juniata	" E. H. C. Leutze	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
April 5, 1884	12° 44′	74° 24′ E.	0° 07′ W.
March 4, 1883	12 45	81 11 W.	3 52 E.
April 4, 1883	12 48	46 36 E.	5 11 W.
Feb. 27, 1884	12 48	71 15 W.	3 18 E.
Aug. 8, 1883	12 50	32 39 W.	15 56 W.
Feb. 11, 1883	12 50	23 32 W.	20 24 W.
April 21, 1884	12 53	56 20 W.	2 11 W.
June 6, 1884	13 00	43 16 E.	3 22 W.
March 14, 1884	13 10	46 29 E.	4 52 W.
April 13, 1884	13 14	112 13 E.	4 04 E.
July 27, 1884	13 15	109 54 E.	3 04 E.
June 10, 1883	13 17	141 55 W.	8 18 E.
July 18, 1883	13 18	80 40 E.	2 05 E.
April 24, 1884	13 19	59 41 W.	1 50 W.
Aug. 8, 1883	13 24	33 18 W.	14 36 W.
April 10, 1884	13 24	165 06 E.	8 01 E.
Aug. 10, 1883	13 31	137 44 W.	6 33 E.
April 6, 1883	13 35	49 59 E.	3 33 W.
Sept. 2, 1884	13 43	109 32 E.	1 27 E.
Jan. 2, 1884	13 58	60 59 W.	0 31 E.
Aug. 1, 1884	14 00	112 38 E.	2 18 E.
Dec. 21, 24, 1883	14 01	61 01 W.	0 23 E.
Feb. 23, 1883	14 08	74 26 W.	2 19 E.

From 10° North to 15° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Trenton	Lt. Asa Walker	Lt. Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" Juniata	" E. H. C. Leutze	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Trenton	Lt. Asa Walker	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Scott.
" Essex	" W. H. Parker	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Essex	" W. H. Parker	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Essex	" W. H. Parker	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 27, 1884	14° 27′	109° 50′ E.	3° 35′ E.
April 25, 1884	14 33	161 05 E.	8 18 E.
Aug. 9, 1883	14 34	34 34 W.	16 51 W.
Dec. 11, 1884	14 37	43 12 W.	12 24 W.
June 11, 1883	14 44	143 53 W.	10 06 E.
June 7, 1884	14 45	42 20 E.	3 58 W.
April 29, 1884	14 46	112 26 E.	1 53 E.
March 29, 1883	14 52	42 14 E.	5 33 W.
Aug. 14, 1883	**14 55**	**94 21 E.**	**1 46 E.** *a*
Feb. 9, 1883	**14 58**	**23 46 W.**	**19 32 W.** *b*

20

a = Mean of observations on 8 equidistant points.

b = " " " " 16 " "

From 10° North to 15° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. Scott.
" Essex	" W. H. Parker	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Essex	" W. H. Parker	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Trenton	Lt. Asa Walker	". Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Juniata	" E. H. C. Leutze	" E .H. C. Leutze.
" Enterprise	" G. A. Norris	" G. A. Norris.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Dec. 12, 1884	15° 04′	45° 50′ W.	10° 20′ W.
June 11, 1883	**15 09**	**144 21 W.**	**8 30 E.** *a*
Aug. 9, 1883	15 12	35 32 W.	14 54 W.
Dec. 12, 1884	15 13	45 24 W.	10 10 W.
Aug. 12, 1883	15 23	139 56 W.	7 37 E.
April 12, 1884	15 27	113 42 E.	2 30 E.
Jan. 17, 1884	15 29	178 16 W.	11 45 E.
April 8, 1883	15 30	55 00 E.	3 09 W.
March 5, 1883	15 30	81 41 W.	3 26 E.
March 17, 1884	15 33	57 39 E.	1 18 W.
Dec. 13, 1884	15 34	46 36 W.	10 06 W.
Aug. 3, 1884	15 36	114 17 E.	2 44 E.
Aug. 10, 1883	15 36	37 27 W.	14 41 W.
Jan. 22, 1884	15 36	172 42 E.	9 32 E.
Jan. 23, 1884	15 40	171 25 E.	9 07 E.
June 12, 1883	**15 48**	**145 23 W.**	**8 48 E.** *a*
Feb. 22, 1883	15 50	72 15 W.	1 07 E.
March 24, 1884	15 52	80 51 W.	5 13 E.
April 7, 1884	16 00	62 00 W.	1 00 W.
March 28, 1883	16 02	41 22 E.	5 18 W.
Aug. 12, 1883	16 02	140 43 W.	7 51 E.
April 25, 1884	16 04	59 32 W.	2 38 W.
Oct. 7, 1883	16 10	114 09 E.	3 02 E.

a=Mean of observations on 28 equidistant points.

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. Kellogg	Lt. Scott.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Pensacola	" F. Hanford	" Hubbard.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Alert	Lt. W. Swift	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" Trenton	" Asa Walker	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Essex	" W. H. Parker	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Alert	" W. Swift	" Diehl.
" Alert	" W. Swift	" Diehl.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Diehl.
" Jamestown	" R. Davenport	" Scott.
" Juniata	" E. H. C. Leutze	" Diehl.
" Pensacola	" F. Hanford	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Enterprise	" G. A. Norris	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 1, 1884	16° 10′	109° 39′ E.	2 23 E.
Dec. 27, 1884	16 13	59 39 W.	2 13 W.
March 18, 1884	16 13	61 21 E.	1 48 W.
Aug. 11, 1883	16 15	40 09 W.	13 28′ W.
Nov. 10, 1884	**16 19**	**24 49 W.**	**19 47 W.** *a*
Dec. 14, 1884	16 23	49 57 W.	9 15 W.
Jan. 28, 1884	16 30	160 15 E.	5 39 E.
April 4, 1884	16 38	72 52 E.	1 35 E.
May 17, 1884	16 44	64 38 W.	0 21 E.
April 11, 1884	16 46	114 04 E.	1 40 E.
Dec. 15, 1884	16 47	51 49 W.	8 11 W.
May 16, 1884	16 48	64 54 W.	0 30 E.
Aug. 12, 1883	16 50	42 42 W.	10 55 W.
Nov. 18, 1882	**16 51**	**99 56 W.**	**7 54 E.** *b*
Aug. 13, 1883	16 52	142 13 W.	8 08 E.
March 24, 1884	16 53	81 33 W.	5 28 E.
March 19, 1884	**16 58**	**65 07 E.**	**0 26 E.** *c*
April 9, 1884	17 00	164 17 E.	8 07 E.
April 25, 1884	**17 00**	**59 31 W.**	**2 30 W.** *c*
Nov. 13, 1882	17 04	100 54 W.	8 33 E.
June 8, 1884	17 07	40 53 E.	3 51 W.
June 13, 1883	17 12	147 36 W.	10 18 E.
Sept. 1, 1884	17 13	109 54 E.	2 54 E.

a = Mean of observations on 12 equidistant points.

b = Mean of 2 sets of observations on 32 points; starboard and port helm.

c = Mean of observations on 16 equidistant points.

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. Scott.
" Swatara	" R. B. Peck	" Scott.
" Trenton	" Asa Walker	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" **Kearsarge**	" **J. D. Adams**	" **J. D. Adams.**
" Essex	" W. Kellogg	" Scott.
" Alert	" W. Swift	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Jamestown	" R. Davenport	" Scott.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. Kellogg	" Scott.
" Jamestown	" R. Davenport	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" **Ranger**	" **W. P. Ray**	" **Hubbard.**
" Pensacola	" F. Hanford	" Hubbard.
" Vandalia	" C. Belknap	" Diehl.
" **Trenton**	" **Asa Walker**	" **A. Walker.**
" Essex	" W. H. Parker	" Diehl.
" **Pensacola**	" **F. Hanford**	" **F. Hanford.**
" Ranger	" W. P. Ray	" Hubbard.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Diehl.
" Essex	" W. H. Parker	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
March 8, 1884	17° 16′	40° 38′ E.	4° 30′ W.
April, 1884	**17 18**	**62 43 W.**	**1 05 W.** *a*
April 25, 1884	17 22	63 24 W.	0 35 W.
Jan. 30, 1884	17 40	155 55 E.	3 48 E.
April, 1884	**17 43**	**64 53 W.**	**0 41 W.** *a*
Aug. 13, 1883	17 50	45 11 W.	10 19 W.
Dec. 16, 1884	17 51	56 06 W.	5 07 W.
April 26, 1884	17 51	157 43 E.	6 59 E.
Nov. 12, 1882	17 56	103 15 W.	7 18 E.
Feb. 8, 1884	**17 58**	**76 48 W.**	**2 20 E.** *b*
Dec. 13, 1883	**17 58**	**73 43 W.**	**1 49 E.** *b*
April 11, 1884	18 00	114 00 E.	2 48 E.
Aug. 14, 1883	18 02	144 46 W.	8 49 E.
June 6, 1883	18 09	72 18 E.	1 43 E.
March 25, 1884	18 15	82 27 W.	4 55 E.
Aug. 13, 1883	18 15	46 12 W.	10 37 W.
March 6, 1883	18 17	82 57 W.	4 09 E.
April 30, 1884	18 20	113 26 E.	2 14 E.
April 10, 1883	18 23	58 10 E.	1 42 W.
Feb. 20, 1883	18 28	69 52 W.	0 02 E.
Dec. 17, 1884	**18 29**	**59 50 W.**	**1 50 W.** *c*
Jan. 7, 1885	**18 33**	**74 43 W.**	**2 30 E.** *d*
Dec. 8 1883	18 36	72 30 W.	2 23 E.

a = Mean of several observations.

b = Mean of observations on 28 equidistant points.

c = " " " " 4 " "

d = " " " " 32 " "

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Trenton	Lt. Asa Walker	Lt. Diehl.
" **Jamestown**	" **R. Davenport**	" **Davenport.**
" Jamestown	" R. Davenport	" Scott.
" Alert	" W. Swift	" Diehl.
" **Jamestown**	" **R. Davenport**	" **Davenport.**
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Essex	" W. H. Parker	" Diehl.
" Ranger	" W. P. Ray	" Hubbard.
" **Swatara**	" **R. B. Peck**	" **R. B. Peck.**
" **Swatara**	" **R. B. Peck**	" **R. B. Peck.**
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Pensacola	Lt. F. Hanford	" Hubbard.
" Juniata	" E. H. C. Leutze	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Vandalia	" C. Belknap	" Hubbard
" Trenton	" Asa Walker	" Diehl.
" Juniata	" E. H. C Leutze	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" **Essex**	" **W. Kellogg**	" **W. Kellogg.**
" **Alliance**	" **J. C. Rich**	" **J. C. Rich.**
" Swatara	" R. B. Peck	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Feb. 13, 1883	**18° 38′**	**72° 55′ W.**	**0° 58′ E.** *a*
Aug. 31, 1884	18 42	111 30 E.	2 32 E.
March 27, 1883	**18 47**	**39 32 E.**	**6 11 W.** *b*
April 8, 1884	18 47	164 04 E.	8 10 E.
July 21, 1883	18 48	85 16 E.	0 50 E.
Jan. 8, 1883	18 51	66 58 W.	1 30 W.
March 13, 1884	**18 56**	**72 52 W.**	**0 57 E.** *c*
Aug. 14, 1883	18 57	47 50 W.	9 18 W.
April 27, 1884	19 02	60 25 W.	3 46 W.
Aug. 5, 1883	19 03	89 58 E.	2 24 E.
March 25, 1884	19 06	82 53 W.	4 49 E.
Jan. 11, 1883	19 12	69 18 W.	0 19 E.
June 23, 1883	19 18	73 27 W.	1 51 E.
April 27, 1884	19 20	156 20 E.	5 59 E.
Aug. 4, 1884	19 25	114 06 E.	2 20 E.
Dec. 2, 1883	19 25	112 31 E.	1 11 E.
June 15, 1883	19 36	151 51 W.	10 18 E.
April 8, 1884	19 38	163 41 E.	8 23 E.
March 22, 1884	19 39	95 13 E.	6 54 E.
Dec. 18, 1883	19 40	59 17 W.	3 22 W.
Sept. 22, 1883	19 40	167 01 E.	8 22 E.
Oct. 19, 1883	19 44	114 04 E.	1 58 E.
Sept. 10, 1883	19 44	174 55 W.	10 18 E.

a = Mean of observations on 16 equidistant points.
b = " " " " 32 "
c = " " " " 24 "

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Vandalia	Lt. C. Belknap	Lt. C. Belknap.
" Essex	" W. H. Parker	" Scott.
" Juniata	" E. H. C. Leutze	" E. H. C. Leutze.
" Essex	" W. H. Parker	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" Galena	" C. H. Judd	" C. H. Judd.
" Galena	" H. W. Lyon	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Essex	" W. H. Parker	" Diehl.
" Essex	" W. H. Parker	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Enterprise	" G. A. Norris	" Scott.
" Pensacola	" F. Hanford	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 21, 1883	19° 45′	168° 27′ E.	8° 34′ E.
Dec. 25, 1884	19 46	59 33 W.	3 54 W.
Sept. 19, 1883	19 48	171 02 E.	9 29 E.
Sept. 19, 1883	19 48	170 20 E.	8 54 E.
Sept. 9, 1883	19 48	172 48 W.	10 26 E.
Sept. 8, 1883	19 49	170 11 W.	10 05 E.
Sept. 7, 1883	19 49	167 25 W.	10 02 E.
Sept. 20, 1883	19 49	169 33 W.	8 52 E.
July 14, 1883	19 50	172 50 W.	10 48 E.
July 15, 1883	19 50	174 26 W.	10 30 E.
Sept. 15, 1883	19 50	176 38 E.	10 33 E.
Sept. 20, 1883	19 50	169 24 E.	8 45 E.
Sept. 11, 1883	19 51	177 12 W.	10 46 E.
July 13, 1883	19 51	170 22 W.	10 24 E.
July 14, 1883	19 51	172 03 W.	10 36 E.
Oct. 20, 1883	19 52	73 36 W.	1 09 E.
Sept. 18, 1883	19 53	172 28 E.	10 22 E.
July 16, 1883	19 53	177 23 W.	10 18 E.
July 16, 1883	**19 53**	**177 23 W.**	**10 18 E.** *a*
Sept. 12, 1883	19 53	179 22 W.	10 58 E.
July 13, 1883	19 55	169 31 W.	10 42 E.
July 12, 1883	19 56	167 51 W.	10 54 E.
March 26, 1883	**19 56**	**38 57 E.**	**5 22 W.** *b*

30

a = Mean of observations on 28 equidistant points.

b = " " " " 32 " "

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Pensacola	Lt. F. Hanford	Lt. Diehl.
" Swatara	" R. B. Peck	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Swatara	" R. B. Peck	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" **Juniata**	" **E. H. C. Leutze**	" **E. H. C. Leutze.**

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 11, 1883	19° 57′	164° 40′ W.	10° 56′ E.
Sept. 23, 1883	19 57	165 35 E.	7 58 E.
July 11, 1883	19 58	165 24 W.	10 50 E.
July 12, 1883	19 58	167 02 W.	11 06 E.
Sept. 16, 1883	19 58	175 15 E.	10 36 E.
July 17, 1883	19 59	178 33 W.	10 42 E.
July 17, 1883	**19 59**	**178 33 W.**	**10 42 E.** *a*
Sept. 6, 1883	19 59	165 01 W.	9 24 E.

a = Mean of observations on 28 equidistant points.

From 15° North to 20° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" W. H. Parker.
" Pensacola	" F. Hanford	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 16, 1883	20° 00′	150° 29′ W.	9° 10′ E.
July 17, 1883	20 01	179 20 W.	10 24 E.
July 16, 1883	20 02	176 46 W.	11 30 E.
Sept. 16, 1883	**20 03**	**174 34 E.**	**8 56 E.** *a*
April 6, 1884	20 04	65 57 W.	0 14 W.
Sept. 23, 1883	20 04	164 49 E.	7 55 E.
July 10, 1883	**20 07**	**162 29 W.**	**9 42 E.** *b*
March 7, 1884	**20 08**	**95 33 W.**	**7 10 E.** *c*
Sept. 17, 1883	20 10	173 53 E.	10 03 E.
Jan. 25, 1883	20 13	70 51 W.	0 55 E.
July 19, 1883	20 15	178 38 E.	10 18 E.
April 28, 1884	20 15	61 04 W.	3 43 W.
March 26, 1884	20 17	83 32 W.	5 24 E.
Sept. 5, 1883	20 17	163 20 W.	9 21 E.
Sept. 24, 1883	20 18	163 25 E.	7 50 E.
July 20, 1883	20 18	177 24 E.	11 30 E.
June 9, 1884	20 19	38 18 E.	4 14 W.
Dec. 2, 1883	20 19	113 09 E.	1 28 E.
April 11, 1884	**20 20**	**72 20 W.**	**0 26 E.** *d*
Aug. 15, 1883	20 21	50 45 W.	8 11 W.
March 23, 1884	20 21	93 47 W.	7 05 E.
July 20, 1883	20 22	176 32 E.	11 34 E.
June 16, 1883	20 25	153 40 W.	11 12 E.

a = Mean of observations on 16 equidistant points.
b = " " " " 28 " "
c = " " " " 4 " "
d = " " " " 32 " "

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Pensacola	Lt. F. Hanford	Lt. Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" **Pensacola**	" **F. Hanford**	" **F. Hanford.**
" Portsmouth	" H. Winslow	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" **Tennessee**	" **S. W. Very**	" **S. W. Very.**
" Pensacola	" F. Hanford	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Pensacola	Lt. F. Hanford	" Diehl.
" **Alliance**	" **J. C. Rich**	" **J. C. Rich.**
" Galena	" H. W. Lyon	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 9, 1883	**20° 25′**	**161° 22′ W.**	**9 48 E.** *a*
Sept. 5, 1883	20 28	162 33 W.	9 34 E.
Feb. 1, 1884	20 29	84 43 W.	4 47 E.
Sept. 25, 1883	20 32	161 24 E.	6 38 E.
March 7, 1883	20 34	84 38 W.	4 09 E.
July 21, 1883	20 34	174 53 E.	11 28 E.
Jan. 4, 1884	**20 35**	**157 45 W.**	**9 57 E.** *b*
Aug. 4, 1884	20 38	114 00 E.	1 33 E.
March 26, 1884	20 40	84 03 W.	5 46 E.
April 29, 1884	20 42	61 51 W.	2 43 W.
May 21, 1883	20 45	69 36 E.	0 20 E.
Feb. 1, 1884	20 47	84 58 W.	5 13 E.
March 23, 1884	20 49	92 47 W.	5 49 E.
July 22, 1883	20 50	172 16 E.	10 10 E.
Sept. 26, 1883	20 50	159 48 E.	5 46 E.
Oct. 20, 1883	20 51	74 10 W.	1 07 E.
Aug. 17, 1883	20 52	153 14 W.	9 49 E.
Sept. 4, 1883	20 54	160 36 W.	9 32 E.
Jan. 30, 1883	20 54	71 29 W.	0 10 W.
July 22, 1883	20 56	171 15 E.	9 45 E.
March 7, 1884	21 00	38 14 E.	2 42 W.
Sept. 3, 1883	21 02	159 03 W.	9 48 E.
June 17, 1883	21 05	155 28 W.	11 20 E.

a = Mean of observations on 28 equidistant points.

b = " " " " 16 " "

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. W. H. Parker.
" Pensacola	" F. Hanford	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Alert	" W. Swift	" Hubbard.
" Essex	" W. H. Parker	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Tennessee	" S. W. Very	" Scott.
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Swatara	" R. B. Peck	" Scott.
" Pensacola	" F. Hanford	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Trenton	" Asa Walker	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 30, 1884	21° 06′	113° 28′ E.	0° 49′ E.
Aug. 19, 1883	**21 10**	**157 54 W.**	**9 09 E.** *a*
Aug. 18, 1883	21 13	155 27 W.	9 24 E.
Sept. 27, 1883	21 13	158 25 E.	5 37 E.
June 17, 1883	21 15	156 13 W.	10 42 E.
July 23, 1883	21 18	169 25 E.	9 34 E.
March 7, 1884	21 22	57 33 W.	6 13 W.
April 7, 1884	21 25	163 19 E.	8 07 E.
April 7, 1884	21 28	66 39 W.	1 04 W.
Feb. 2, 1884	21 32	85 27 W.	4 58 E.
April 10, 1884	21 32	76 30 W.	0 31 E.
Dec. 1, 1883	21 34	114 03 E.	0 46 E.
Dec. 17, 1883	21 36	59 21 W.	5 33 W.
Sept. 28, 1883	21 39	156 42 E.	4 45 E.
July 24, 1883	21 45	167 44 E.	8 55 E.
May 23, 1884	21 49	66 13 W.	0 45 W.
July 25, 1883	21 55	166 00 E.	8 46 E.
March 24, 1884	21 56	90 09 W.	5 42 E.
April 30, 1884	22 00	62 24 W.	3 08 W.
Aug. 16, 1883	22 00	54 43 W.	8 06 W.
Feb. 2, 1884	22 04	85 47 W.	5 21 E.
March 27, 1884	22 05	85 07 W.	4 47 E.
April 7, 1884	22 06	163 09 E.	7 40 E.

a=Mean of observations on 16 equidistant points.

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. Scott.
" Pensacola	" F. Hanford	" F. Hanford.
" Pensacola	" F. Hanford	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Portsmouth	" H. Winslow	" Scott.
" Essex	" W. H. Parker	" Diehl.
" Portsmouth	" H. Winslow	" Scott.
" Tennessee	" S. W. Very	" Scott.
" Yantic	" C. W. Ruschenberger	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Jamestown	" R. Davenport	" Scott.
" Essex	" W. H. Parker	" Hubbard.
" Tennessee	" S. W. Very	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Essex	" W. H. Parker	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 25, 1881	22° 10′	38° 08′ W.	17° 44′ W.
March 25, 1883	22 12	37 32 E.	4 09 W.
Sept. 25, 1881	22 13	38 45 W.	17 20 W.
Sept. 24, 1881	22 14	37 00 W.	18 22 W.
Sept. 26, 1881	22 14	39 41 W.	16 00 W.
June 11, 1884	22 15	37 15 E.	3 58 W.
Sept. 26, 1881	22 17	40 02 W.	17 40 W.
Sept. 27, 1881	22 17	40 51 W.	15 47 W.
Sept. 27, 1881	22 20	41 07 W.	16 16 W.
Sept. 28, 1881	22 20	41 52 W.	15 36 W.
Sept. 29, 1881	22 20	42 37 W.	15 23 W.
July 26, 1883	22 20	164 51 E.	7 44 E.
March 25, 1884	22 22	88 30 W.	5 06 E.
Sept. 23, 1881	22 22	34 13 W.	19 30 W.
Sept. 29, 1881	22 25	43 14 W.	15 06 W.
Sept. 30, 1881	22 25	44 13 W.	14 08 W.
Oct. 1, 1881	22 30	45 52 W.	13 54 W.
Sept. 23, 1881	22 30	34 57 W.	21 24 W.
March 25, 1884	22 30	87 28 W.	4 17 E.
March 6, 1884	22 30	93 54 W.	6 53 E.
Oct. 2, 1881	22 30	48 24 W.	12 06 W.
Sept. 30, 1881	22 34	44 49 W.	13 55 W.
Feb. 4, 1883	**22 35**	**84 50 W.**	**3 28 E.** *a*

a = Mean of observations on 32 equidistant points.

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Juniata	Lt. E. H. C. Leutze	Lt. Diehl.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Richmond	" E. S. Houston	Lt. Diehl.
" Trenton	" T. A. Lyons	Lt. Com. Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Essex	Lt. W. H. Parker	Lt. Hubbard.
" Tennessee	" S. W. Very	" Scott.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Tennessee	Lt. S. W. Very	Lt. Scott.
" Tennessee	" S. W. Very	" Scott.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Alliance	Lt. C. P. Perkins	Lt. C. P. Perkins.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 29, 1883	22° 36′	154° 10′ E.	3° 42′ E.
Oct. 4, 1881	22 36	53 33 W.	8 30 W.
Oct. 4, 1881	22 37	54 15 W.	8 11 W.
March 8, 1883	22 37	84 53 W.	5 13 E.
June 16, 1883	22 37	69 10 W.	1 18 W.
Oct. 2, 1881	22 37	49 12 W.	11 45 W.
Oct. 3, 1881	22 37	51 00 W.	10 25 W.
May 11, 1884	**22 38**	**116 48 E.**	**0 17 E. *a***
Oct. 3, 1881	22 38	51 56 W.	9 35 W.
Nov. 10, 1882	22 40	110 20 W.	5 32 E.
July 26, 1883	**22 40**	**164 25 E.**	**7 43 E. *b***
Oct. 5, 1881	22 42	55 10 W.	7 33 W.
April 7, 1884	22 42	67 10 W.	1 53 W.
March 26, 1884	22 47	84 14 W.	3 12 E.
Aug. 17, 1883	22 50	56 38 W.	7 07 W.
April 6, 1884	22 58	78 55 W.	3 11 E.
Oct. 5, 1881	23 00	55 36 W.	8 35 W.
Sept. 22, 1881	23 00	32 20 W.	19 00 W.
April, 1884	**23 02**	**81 43 W.**	**2 34 E. *c***
Aug. 6, 1884	23 03	44 14 W.	12 34 W.
March 27, 1884	23 05	84 34 W.	3 56 E.
Dec. 16, 1884	**23 07**	**113 14 E.**	**0 40 E. *a***
Oct. 6, 1881	23 13	56 10 W.	8 12 W.

a = Mean of observations on 16 equidistant points.
b = " " " " 12 " "
c = " " " " 4 " "

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Pensacola	Lt. F. Hanford	Lt. Com. Lyons.
" Trenton	Lt. Com. T. A. Lyons	" Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Vandalia	Lt. C. Belknap	Lt. Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" **Trenton**	**Lt. Asa Walker**	**Lt. A. Walker.**
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Ranger	Lt. W. P. Ray	Lt. Hubbard.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Portsmouth	Lt. H. Winslow	Lt. Scott.
" Tennessee	" S. W. Very	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" **Vandalia**	**Lt. C. Belknap**	" **Diehl.**
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" **Alert**	" **W. Swift**	" **Scott.**
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 27, 1883	23° 14′	163° 11′ E.	6° 28′ E.
Feb. 3, 1884	23 16	86 29 W.	5 04 E.
Aug. 17, 1883	23 18	57 42 W.	6 07 W.
March 24, 1883	23 18	37 00 E.	4 49 W.
May 20, 1883	23 19	67 21 E.	0 47 E.
March 6, 1884	23 19	93 17 W.	6 53 E.
April 5, 1884	23 20	79 25 W.	2 45 E.
May 6, 1884	**23 21**	**37 02 E.**	**4 19 W.** *a*
March 6, 1884	23 23	93 10 W.	6 41 E.
April 15, 1884	23 23	81 08 W.	4 10 E.
April 12, 1884	23 31	80 51 W.	4 24 E.
Aug. 10, 1881	23 33	53 13 W.	9 11 W.
May 25, 1884	23 33	66 59 W.	1 15 W.
Aug. 5, 1884	23 38	42 32 W.	14 35 W.
Oct. 6, 1881	23 43	56 51 W.	9 08 W.
Sept. 21, 1881	23 47	28 48 W.	20 30 W.
March 28, 1884	23 48	82 58 W.	3 19 E.
April 4, 1884	23 52	80 30 W.	3 28 E.
Oct. 18, 1883	23 52	59 12 W.	5 59 W.
April 4, 1884	23 55	80 47 W.	2 10 E.
April 13, 1884	23 56	80 28 W.	2 56 E.
Aug. 11, 1884	**23 57**	**55 40 W.**	**7 39 W.** *b*
Feb. 3, 1884	23 58	86 55 W.	5 30 E.

a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. J. Hubbard.
" Tennessee	" S. W. Very	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" **Trenton**	" **Asa Walker**	" **A. Walker.**
" Tennessee	" S. W. Very	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Swatara	" R. B. Peck	" Scott.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Jamestown	Lt. R. Davenport	" Scott.
" Richmond	Lt. Com. E. S. Houston	Lt. Diehl.
" Trenton	" T. A. Lyons	Lt. Com. Lyons.
" Trenton	" T. A. Lyons	" Lyons.
" Vandalia	Lt. C. Belknap	Lt. Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" **Richmond**	**Lt. Com. E. S. Houston**	**Lt. Com. Houston.**
" Tennessee	Lt. S. W. Very	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 19, 1883	23° 58′	74° 22′ W.	1° 04′ E.
April 6, 1884	24 00	162 38 E.	6 39 E.
May 25, 1884	24 00	67 03 W.	1 14 W.
Nov. 9, 1882	24 01	111 54 W.	8 40 E.
Aug. 3, 1884	**24 13**	**40 23 W.**	**16 07 W.** *a*
Aug. 2, 1884	24 16	38 38 W.	17 44 W.
Aug. 12, 1884	24 18	57 43 W.	6 31 W.
Sept. 20, 1881	24 19	27 15 W.	20 30 W.
Aug. 1, 1884	24 21	36 20 W.	18 23 W.
Sept. 30, 1883	24 24	151 53 E.	1 42 E.
May 1, 1884	24 25	62 58 W.	4 06 W.
April 1, 1884	24 25	72 17 W.	1 20 W.
May 10, 1884	**24 25**	**81 46 W.**	**2 49 E.** *a*
May 10, 1884	24 27	81 27 W.	1 58 E.
Sept. 30, 1883	24 27	151 50 E.	1 55 E.
April 4, 1884	24 27	81 48 W.	3 00 E.
Dec. 16, 1883	24 30	60 04 W.	5 50 W.
March 6, 1884	24 31	36 13 E.	5 55 W.
July 31, 1883	24 31	159 11 E.	5 00 E.
June 15, 1883	24 32	66 51 W.	3 42 W.
April 17, 1883	24 37	57 35 E.	0 44 E.
April 6, 1884	24 45	162 14 E.	5 39 E.
Dec. 16, 1883	24 47	60 06 W.	7 06 W.

a = Mean of observations on 8 equidistant points.

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Swatara	Lt. R. B. Peck	Lt. Scott.
" Essex	" W. H. Parker	" Diehl.
" Jamestown	" R. Davenport	" Scott.
" Ranger	" W. P. Ray	" Hubbard.
" **Richmond**	**Lt. Com. E. S. Houston**	**Lt. Com. Houston.**
" Richmond	" E. S. Houston	" Diehl.
" Richmond	" E. S. Houston	" Diehl.
" Trenton	" T. A. Lyons	Lt. Com. Lyons.
" Richmond	" E. S. Houston	Lt. Diehl.
" Pensacola	Lt. F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Yantic	" C. W. Ruschenberger	" Scott.
" **Swatara**	" **R. B. Peck**	" **R. B. Peck.**
" Tennessee	" S. W. Very	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Vandalia	" C. Belknap	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Vandalia	" C. Belknap	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 15, 1883	24° 48′	62° 52′ E.	1° 02′ E.
Aug. 13, 1884	24 51	59 25 W.	5 03 W.

From 20° North to 25° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Juniata	Lt. E. H. C. Leutze	Lt. Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 14, 1883	25° 00′	60° 49′ E.	0° 14′ W.
March 23, 1883	25 00	35 50 E.	5 50 W.
June 25, 1883	25 03	73 47 W.	1 16 W.
May 12, 1883	25 03	59 00 E.	1 22 E.
April 5, 1883	25 11	83 41 W.	3 55 E.
March 13, 1883	25 17	85 41 W.	4 04 E.
May 11, 1883	25 28	57 08 E.	0 25 W.
March 4, 1884	25 30	87 28 W.	5 01 E.
Dec. 16, 1883	25 30	60 36 W.	7 17 W.
April 5, 1883	25 34	84 10 W.	3 18 E.
July 17, 1884	25 39	120 55 E.	1 07 W.
March 12, 1884	25 46	77 02 W.	1 12 W.
Aug. 14, 1884	25 49	61 16 W.	4 56 W.
March 14, 1884	26 00	121 15 E.	3 42 W.
May 23, 1884	26 05	79 56 W.	1 43 E.
Oct. 1, 1883	26 10	149 43 E.	0 48 E.
June 13, 1884	26 11	35 02 E.	4 14 W.
April 10, 1884	26 14	69 47 W.	1 33 W.
April 4, 1883	26 15	86 44 W.	5 13 E.
May 11, 1884	26 15	79 46 W.	2 58 E.
Feb. 4, 1884	26 24	87 47 W.	4 48 E.
May 27, 1884	26 27	67 20 W.	3 16 W.
Sept. 18, 1881	26 30	23 37 W.	18 40 W.

From 25° North to 30° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Juniata	Lt. E. H. C. Leutze	Lt. Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" Juniata	" E. H. C. Leutze	" Diehl.
" Yantic	" E. S. Prime	" Scott.
" Vandalia	" C. Belknap	" Hubbard.
" Juniata	" E. H. C. Leutze	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" Essex	" W. H. Parker	" Scott.
" Yantic	" C. W. Ruschenberger	" Scott.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Portsmouth	Lt. H. Winslow	" Scott.
" Yantic	" E. S. Prime	" Scott.
" Swatara	" R. B. Peck	" Scott.
" Tennessee	" S. W. Very	" Scott.
" Jamestown	" R. G. Davenport	" Scott.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
April 4, 1883	26° 30′	86° 15′ W.	4° 50′ E.
March 22, 1883	26 32	34 36 W.	6 18 W.
April 4, 1883	26 37	86 25 W.	3 31 E.
Aug. 21, 1883	26 42	64 43 W.	6 04 W.
Aug. 15, 1884	26 44	62 47 W.	5 35 W.
May 6, 1883	26 48	52 55 E.	0 20 E.
July 28, 1884	**26 52**	**26 00 W.**	**20 19 W.** *a*
May 10, 1883	**26 56**	**56 26 E.**	**0 19 W.** *a*
April 12, 1883	26 58	79 47 W.	2 01 E.
Dec. 31, 1883	27 00	120 26 E.	2 22 E.
Dec. 15, 1883	27 00	62 20 W.	5 37 W.
April 5, 1884	27 00	161 11 E.	5 06 E.
Sept. 18, 1881	27 00	23 00 W.	19 20 W.
April 11, 1884	27 00	69 36 W.	2 39 W.
Feb. 5, 1884	27 15	88 23 W.	5 15 E.
Aug. 21, 1883	27 16	65 10 W.	6 33 W.
March 19, 1884	27 20	79 25 W.	0 20 E.
April 8, 1883	27 21	79 43 W.	1 36 E.
May 28, 1884	27 27	67 31 W.	3 44 W.
March 5, 1884	27 32	57 47 W.	9 58 W.
May 23, 1884	27 36	79 42 W.	2 15 E.
Nov. 10, 1883	27 38	123 20 E.	2 08 W.
Oct. 2, 1883	27 44	148 05 E.	0 15 W.

a=Mean of observations on 8 equidistant points.

From 25° North to 30° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Yantic	Lt. E. S. Prime	Lt. Scott.
" Juniata	" E. H. C. Leutze	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" Galena	" H. W. Lyon	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Juniata	Lt. E. H. C. Leutze	" Diehl.
" **Richmond**	**Lt. Com. E. S. Houston**	**Lt. Com. Houston.**
" **Juniata**	**Lt. E. H. C. Leutze**	**Lt. E. H. C. Leutze.**
" Yantic	" E. S. Prime	" Scott.
" Juniata	" E. H. C. Leutze	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Portsmouth	Lt. H. Winslow	Lt. Scott.
" Tennessee	" S. W. Very	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Yantic	" C.W. Ruschenberger	" Scott.
" Vandalia	" C. Belknap	" Hubbard.
" Jamestown	" R. G. Davenport	" Scott.
" Portsmouth	" H. Winslow	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 22, 1883	27° 45′	66° 05′ W.	5° 08′ W.
April 12, 1884	27 50	70 05 W.	1 58 W.
Aug. 16, 1884	27 55	64 26 W.	5 23 W.
March 4, 1884	28 00	89 37 W.	5 52 E.
April 12, 1883	28 08	79 44 W.	1 57 E.
Nov. 9, 1883	28 12	122 54 E.	2 46 W.
May 11, 1884	28 18	79 48 W.	1 29 E.
March 11, 1884	28 21	76 55 W.	1 16 W.
Aug. 23, 1883	28 30	67 27 W.	4 36 W.
Oct. 9, 1881	28 33	64 35 W.	8 39 W.
June 14, 1884	**28 46**	**32 58 E.**	**4 19 W.** *a*
May 29, 1884	28 53	67 50 W.	4 41 W.
Sept. 17, 1881	28 55	21 07 W.	18 40 W.
Aug. 17, 1884	28 56	65 54 W.	5 03 W.
July 15, 1884	29 00	123 38 E.	0 42 W.
Oct. 3, 1883	29 01	146 54 E.	1 20 W.
Feb. 6, 1884	**29 11**	**89 16 W.**	**5 15 E.** *b*
July 14, 1884	29 19	125 27 E.	1 34 W.
Aug. 6, 1883	29 30	150 00 E.	2 42 E.
June 13, 1883	29 34	64 55 W.	4 47 W.
Oct. 14, 1883	29 50	65 24 W.	5 00 W.
Dec. 22, 1884	**29 54**	**123 11 E.**	**2 51 W.** *c*
Aug. 24, 1883	29 55	68 42 W.	5 51 W.
May 2, 1884	29 57	144 30 E.	0 59 W.

a = Mean of observations on 8 equidistant points.

b = Mean of 6 observations on different points while at anchor.

c = Mean of observations on 16 equidistant points.

From 25° North to 30° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Galena	Lt. H. W. Lyon	Lt. Diehl.
" Portsmouth	" H. Winslow	" Scott.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Tennessee	Lt. S. W. Very	" Scott.
" Yantic	" E. S. Prime	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Yantic	" C.W. Ruschenberger	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" **Richmond**	**Lt. Com. E. S. Houston**	**Lt. Com. Houston.**
" Jamestown	Lt. R. G. Davenport	Lt. Scott
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Richmond	" E. S. Houston	Lt. Diehl.
" Essex	Lt. W. H. Parker	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" **Tennessee**	" **S. W. Very**	" **Scott.**
" Essex	" W. H. Parker	" Scott.
" Essex	" W. H. Parker	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Jamestown	" R. G. Davenport	" Scott.
" **Juniata**	" **E. H. C. Leutze**	" **E. H. C. Leutze.**
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. H. Parker	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
March 12, 1883	**30° 08′**	**88° 01′ W.**	**5° 17′ E.** *a*
Aug. 6, 1883	**30 08**	**149 41 E.**	**0 54 E.** *b*
March 31, 1884	30 08	151 53 E.	0 06 E.
Oct. 4, 1883	30 12	145 25 E.	1 27 W.
Nov. 7, 1883	30 16	126 30 E.	3 37 W.
Aug. 24, 1883	30 23	69 11 W.	5 10 W.
Aug. 18, 1884	30 24	67 25 W.	4 54 W.
Oct. 16, 1883	30 26	70 59 W.	2 22 W.
May 24, 1884	30 32	79 47 W.	0 13 W.
Dec. 13, 1883	30 36	66 37 W.	5 39 W.
May 30, 1884	30 39	68 09 W.	5 10 W.
June 5, 1884	**30 41**	**126 24 E.**	**3 34 W.** *c*
March 30, 1884	30 41	149 22 E.	0 12 W.
April 14, 1884	30 41	71 55 W.	2 31 W.
Aug. 25, 1883	30 43	69 32 W.	4 34 W.
June 6, 1884	30 47	123 53 E.	3 09 W.
July 13, 1884	30 52	127 09 E.	1 46 W.
Oct. 15, 1883	30 54	66 03 W.	3 45 W.
Oct. 10, 1881	30 58	68 10 W.	9 13 W.
May 3, 1884	31 00	143 30 E.	0 35 E.
Aug. 25, 1883	31 00	69 22 W.	5 06 W.
Aug. 7, 1883	**31 02**	**149 16 E.**	**0 15 E.** *b*
Dec. 20, 1884	31 03	63 04 W.	8 39 W.

a = Mean of observations on 32 equidistant points.
b = " " " " 24 " "
c = " " " " 28 " "

From 30° North to 35° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Yantic	Lt. E. S. Prime	Lt. E. S. Prime.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Swatara	Lt. R. B. Peck	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Jamestown	" R. G. Davenport	" Scott.
" Juniata	" E. H. C. Leutze	" E. H. C. Leutze.
" Essex	" W. H. Parker	" Diehl.
" Portsmouth	" H. Winslow	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Essex	" W. H. Parker	" Scott.
" Jamestown	" R. G. Davenport	" Scott.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Essex	Lt. W. H. Parker	Lt. Scott.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Swatara	" R. B. Peck	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 3, 1884	31° 04′	128° 31′ E.	4° 37′ W.
Nov. 6, 1883	31 08	128 08 E.	4 02 W.
March 29, 1884	31 14	147 51 E.	0 59 W.
June 12, 1883	31 18	65 42 W.	7 17 W.
Nov. 6, 1882	31 21	118 40 W.	12 34 E.
May 12, 1884	31 24	79 12 W.	1 03 E.
Oct. 16, 1883	31 24	70 32 W.	3 12 W.
April 21, 1884	31 28	29 41 E.	7 27 W.
May 11, 1881	**31 34**	**132 14 E.**	**3 34 W.** *a*
May 12, 1884	31 36	78 34 W.	0 00 --
May 24, 1884	31 40	78 45 W.	0 06 E.
Aug. 26, 1883	31 45	70 50 W.	3 51 W.
Aug. 8, 1883	**31 46**	**147 13 E.**	**0 48 W.** *b*
June 18, 1884	31 46	31 41 E.	5 27 W.
Oct. 10, 1881	31 48	69 18 W.	8 24 W.
Oct. 5, 1883	31 56	143 03 E.	1 07 W.
Aug. 8, 1883	**32 01**	**146 08 E.**	**1 36 W.** *c*
Dec. 5, 1884	32 16	127 26 E.	4 06 W.
Aug. 26, 1883	32 19	71 44 W.	4 02 W.
Dec. 12, 1883	32 27	69 08 W.	5 52 W.
Aug. 19, 1884	**32 31**	**69 48 W.**	**5 04 W.** *d*
May 25, 1884	32 32	127 27 E.	4 11 W.
Aug. 9, 1883	32 36	143 44 E.	2 45 W.

a = Mean of observations on 16 equidistant points.
b = " " " " 24 " "
c = " " " " 28 " "
d = " " " " 8 " "

From 30° North to 35° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Juniata	Lt. E. H. C. Leutze	Lt. Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Vandalia	" C. Belknap	" Hubbard.
" Ranger	" W. P. Ray	" Hubbard.
" Tennessee	" S. W. Very	" Scott.
" Swatara	" R. B. Peck	" Scott.
" Quinnebaug	" W. P. Day	" Scott.
" **Richmond**	" **C. S. Sperry**	" **C. S. Sperry.**
" Swatara	" R. B. Peck	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Trenton	" T. A. Lyons	Lt. Com. Lyons.
" Pensacola	Lt. F. Hanford	Lt. Diehl.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" Juniata	" E. H. C. Leutze	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" **Richmond**	**Lt. Com. E. S. Houston**	" **Scott.**
" Juniata	Lt. E. H. C. Leutze	" Diehl.
" Essex	" W. H. Parker	" Hubbard.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
April 16, 1884	32° 37′	25° 07′ E.	7° 25′ W.
Feb. 26, 1884	**32 41**	**126 23 E.**	**4 53 W.** *a*
Feb. 26, 1884	**32 43**	**129 41 E.**	**4 13 W.** *b*
April 19, 1883	32 45	78 41 W.	2 22 E.
April 22, 1884	32 46	28 56 E.	7 46 W.
June 11, 1883	32 52	67 13 W.	6 19 W.
April 12, 1884	32 55	14 05 E.	8 16 W.
May 24, 1884	32 55	125 29 E.	4 15 W.
June 20, 1884	33 03	25 36 E.	6 34 W.
Feb. 24, 1884	33 13	27 46 E.	7 05 W.
Aug. 27, 1883	33 14	72 43 W.	3 42 W.
Oct. 11, 1881	33 15	71 17 W.	6 54 W.
Oct. 11, 1884	33 15	124 25 E.	3 33 W.
June 19, 1884	33 16	27 20 E.	6 12 W.
Oct. 12, 1884	33 18	125 43 E.	3 41 W.
May 4, 1883	33 27	77 32 W.	0 58 W.
May 7, 1884	33 33	67 24 W.	8 36 W.
Aug. 10, 1883	33 34	141 40 E.	2 57 W.
July 20, 1884	33 42	136 34 E.	3 18 W.
July 21, 1884	33 46	12 29 W.	20 28 W.
Oct. 11, 1881	33 54	72 11 W.	7 28 W.
Nov. 5, 1882	34 05	121 00 W.	12 41 E.
June 1, 1884	**34 05**	**133 30 E.**	**3 52 W.** *c*

a = Mean of observations on 32 equidistant points.
b = " " " " 16 " "
c = " " " " 24 " "

From 30° North to 35° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Quinnebaug	Lt. W. P. Day	Lt. Scott.
" **Juniata**	" **E. H. C. Leutze**	" **Hubbard.**
" **Alert**	" **W. Swift**	" **Hubbard.**
" Vandalia	" C. Belknap	" Hubbard.
" Quinnebaug	" W. P. Day	" Scott.
" Vandalia	" C. Belknap	" Hubbard.
" Quinnebaug	" W. P. Day	" Scott.
" Juniata	" E. H. C. Leutze	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Trenton	Lt. Asa Walker	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Juniata	Lt. E. H. C. Leutze	Lt. Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Juniata	Lt. E. H. C. Leutze	" Diehl.
" Yantic	" E. S. Prime	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Juniata	" E. H. C. Leutze	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Trenton	" T. A. Lyons	Lt. Com. Lyons.
" Ranger	Lt. W. P. Ray	Lt. Hubbard.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Dec. 17, 1884	34° 09′	68° 48′ W.	7° 43′ W.
May 25, 1884	34 15	75 15 W.	3 40 W.
May 8, 1884	34 19	69 28 W.	7 40 W.
July 20, 1884	34 29	9 50 W.	19 11 W.
May 20, 1884	34 30	139 00 E.	0 24 W.
July 20, 1884	**34 33**	**9 32 W.**	**18 45 W.** *a*
May 23, 1884	34 35	124 12 E.	3 49 W.
June 23, 1884	34 36	25 13 E..	6 43 W.
May 13, 1884	34 36	75 33 W.	4 39 W.
May 5, 1883	34 39	75 10 W.	3 01 W.
Oct. 23, 1883	**34 42**	**139 10 E.**	**3 53 W.** *b*
Dec. 11, 1883	34 43	72 23 W.	6 01 W.
May 8, 1884	34 44	70 47 W.	6 48 W.
Feb. 27, 1884	34 46	124 41 E.	5 18 W.
March 1, 1883	34 51	22 54 E.	8 03 W.
June 4, 1884	34 54	73 34 W.	4 11 W.

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a = Mean of observations on 8 equidistant points.

b = " " " " 16 " "

From 30° North to 35° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Swatara	Lt. R. B. Peck	Lt. Scott.
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Scott.
" **Richmond**	**Lt. Com. E. S. Houston**	**Lt. Com. Houston.**
" Juniata	Lt. E. H. C. Leutze	Lt. Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Swatara	Lt. R. B. Peck	" Scott.
" Yantic	" E. S. Prime	" Scott.
" **Pensacola**	" **F. Hanford**	" **F. Hanford.**
" Vandalia	" C. Belknap	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Jamestown	" R. G. Davenport	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 13, 1883	35° 04′	70° 55′ W.	6° 37′ W.
Dec. 11, 1882	35 08	44 42 W.	22 32 W.
Feb. 28, 1883	35 09	19 28 E.	9 09 W.
Dec. 12, 1882	35 10	40 14 W.	24 48 W.
June 5, 1884	35 10	73 21 W.	3 35 W.
Nov. 5, 1882	35 19	121 44 W.	12 37 E.
Oct. 12, 1881	35 21	73 57 W.	6 37 W.
June 24, 1884	35 22	22 04 E.	7 54 W.
April 30, 1885	**35 25**	**17 02 E.**	**9 36 W.** *a*
Nov. 23, 1882	**35 26**	**139 39 E.**	**3 49 W.** *a*
April 12, 1880	35 30	20 40 E.	11 43 W.
July 19, 1884	35 30	6 40 W.	16 53 W.
April 23, 1884	35 32	27 58 E.	8 47 W.
Dec. 22, 1883	**35 46**	**125 37 E.**	**3 54 W.** *b*
Dec. 10, 1882	35 47	47 20 W.	21 40 W.
Dec. 23, 1883	35 50	13 43 W.	20 45 W.
Dec. 2, 1882	36 02	64 50 W.	12 55 W.
Dec. 4, 1882	36 04	57 00 W.	15 53 W.
Jan. 23, 1883	**36 06**	**5 22 W.**	**17 06 W.** *c*
Dec. 13, 1882	36 09	35 50 W.	27 45 W.
June 13, 1884	36 12	4 34 W.	17 03 W.
Oct. 12, 1881	36 16	75 04 W.	4 33 W.
June 6, 1884	36 20	72 57 W.	4 31 W.

a = Mean of observations on 32 equidistant points.
b = " " " " 8 " "
c = " " " " 6 points.

From 35° North to 40° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Swatara	Lt. R. B. Peck	Lt. Scott.
" Juniata	" E. H. C. Leutze	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Jamestown	" R. G. Davenport	" Scott.
" Ranger	" W. P. Ray	" Hubbard.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Richmond	" E. S. Houston	Lt. Diehl.
" **Marion**	**Lt. J. W. Hagenman**	" **Hagenman.**
" **Richmond**	**Lt. Com. E. S. Houston**	**Lt. Com. Houston.**
" Trenton	" T. A. Lyons	" Lyons.
" Richmond	" E. S. Houston	Lt. Diehl.
" Quinnebaug	Lt. W. P. Day	" Scott.
" **Enterprise**	" **G. A. Norris**	" **G. A. Norris.**
" Juniata	" E. H. C. Leutze	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" **Juniata**	" **E. H. C. Leutze**	" **Diehl.**
" Juniata	" E. H. C. Leutze	" Diehl.
" Ossipee	" J. A. Rodgers	" Scott.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Jamestown	Lt. R. G. Davenport	Lt. Scott.

North Latitude:

(1)	(2)				(3)		
Date of observation.	Place of observation.				Variation.		
	Latitude.		Longitude.				
Feb. 27, 1884	36°	22′	75°	08′ W.	4°	13′	W.
May 22, 1884	36	22	125	57 E.	4	27	W.
Sept. 30, 1883	36	30	6	47 W.	17	22	W.
June 25, 1884	**36**	**30**	**19**	**00 E.**	**8**	**42**	**W.** *a*
Sept. 30, 1883	36	34	7	42 W.	17	12	W.
Oct. 31, 1884	36	35	8	00 W.	18	16	W.
Oct. 19, 1883	36	38	3	04 W.	15	41	W.
June 14, 1884	36	38	1	03 W.	15	37	W.
Nov. 10, 1884	**36**	**45**	**12**	**25 E.**	**10**	**07**	**W.** *b*
Jan. 24, 1883	36	49	1	32 W.	16	46	W.
May 27, 1884	36	49	20	40 E.	8	20	W.
Nov. 16, 1884	36	50	1	42 W.	16	15	W.
Dec. 9, 1883	36	50	76	17 W.	2	39	W.
May 10, 1884	**36**	**54**	**75**	**45 W.**	**3**	**37**	**W.** *c*
Aug. 29, 1883	**36**	**54**	**75**	**54 W.**	**3**	**35**	**W.** *d*
Dec. 10, 1883	**36**	**56**	**75**	**57 W.**	**3**	**39**	**W.** *a*
Jan. 2, 1883	**36**	**56**	**76**	**06 W.**	**3**	**10**	**W.** *e*
June 30, 1883	**36**	**57**	**76**	**02 W.**	**3**	**06**	**W.** *d*
Dec. 16, 1884	36	58	70	03 W.	8	51	W.
June 16, 1881	**37**	**00**	**76**	**10 W.**	**3**	**11**	**W.** *f*
Oct. 10, 1884	**37**	**00**	**76**	**06 W.**	**2**	**55**	**W.** *a*
April 19, 1884	37	00	73	04 W.	6	17	W.
June 29, 1884	**37**	**00**	**17**	**48 E.**	**9**	**06**	**W.** *g*

a = Mean of observations on 8 equidistant points.
b = " " " " 28 " "
c = " " " " 16 " "
d = " " " " 24 " "
e = Mean of 3 results determined by one swinging with starboard helm, observations on 8 equidistant points, and two with port helm; observations on 16 and 8 equidistant points respectively.
f = Mean of two sets of observations on 28 equidistant points; starboard and port helm.
g = Mean of observations on 32 equidistant points.

From 35° North to 40° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Portsmouth	Lt. H. Winslow	Lt. Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" **Richmond**	**Lt. Com. E. S. Houston**	" **Hubbard.**
" Kearsarge	Lt. A. Dunlap	" Diehl.
" Lancaster	" H. N. Manney	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Ossipee	" J. A. Rodgers	" Scott.
" **Quinneba'g**	" **E. W. Sturdy**	" **E. W. Sturdy.**
" Juniata	" E. H. C. Leutze	" Diehl.
" Quinnebaug	" W. P. Day	" Scott.
" Lancaster	" H. N. Manney	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" **Pensacola**	" **F. Hanford**	" **F. Hanford.**
" **Galena**	" **H. W. Lyon**	" **H. W. Lyon.**
" **Vandalia**	" **C. Belknap**	" **C. Belknap.**
" **Enterprise**	" **G. A. Norris**	" **G. A Norris.**
" **Vandalia**	" **C. Belknap**	" **C. Belknap.**
" Swatara	" R. B. Peck	" Scott.
" **Alliance**	" **C. P. Perkins**	" **Scott.**
" **Powhatan**	" **C. C. Cornwell**	" **C. C. Cornwell.**
" Portsmouth	" H. Winslow	" Diehl.
" **Ossipee**	" **J. A. Rodgers**	" **J. A. Rodgers.**

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Dec. 25, 1883	37° 11′	11° 25′ W.	20° 29′ W.
April 11, 1880	37 20	16 40 E.	11 10 W.
May 24, 1884	**37 25**	**15 04 W.**	**20 02 W.** *a*
March 16, 1884	37 27	126 33 E.	5 20 W.
Dec. 20, 1883	37 27	24 07 W.	25 06 W.
Oct. 22, 1881	37 28	75 03 W.	2 36 W.
Dec. 14, 1882	37 35	31 53 W.	27 19 W.
Jan. 6, 1883	37 35	17 13 W.	22 39 W.
Sept. 29, 1883	37 42	9 25 W.	18 56 W.
June 16, 1884	37 46	5 50 E.	13 49 W.
May 23, 1884	37 50	18 18 W.	23 10 W.
June 7, 1884	37 52	71 51 W.	7 00 W.
Dec. 26, 1883	37 53	9 58 W.	20 03 W.
May 16, 1884	38 05	34 58 W.	24 44 W.
May 16, 1884	**38 08**	**33 53 W.**	**24 06 W.** *a*
June 21, 1884	**38 09**	**13 24 E.**	**10 34 W.** *b*
July 13, 1881	38 10	16 30 E.	9 30 W.
June 17, 1884	38 11	9 05 E.	12 39 W.
May 20, 1884	38 12	28 03 W.	24 15 W.
July 15, 1884	38 15	71 41 W.	9 07 W.
July 20, 1883	38 17	74 07 W.	6 14 W.
April 2, 1884	**38 18**	**10 12 E.**	**12 15 W.** *b*
Jan. 27, 1883	38 20	10 06 E.	12 25 W.

a = Mean of observations on 8 equidistant points.

b = " " " " 32 " "

From 35° North to 40° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Trenton	Lt. Asa Walker	Lt. Diehl.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" **Ossipee**	**Lt. J. A. Rodgers**	" **J. A. Rodgers.**
" Juniata	" E. H. C. Leutze	Lt. Diehl.
" Trenton	" Asa Walker	" Diehl.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Juniata	Lt. E. H. C. Leutze	Lt. Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Ossipee	" J. A. Rodgers	" Scott.
" Ossipee	" J. A. Rodgers	" Scott.
" Jamestown	" R. G. Davenport	" Scott.
" Trenton	" Asa Walker	" Diehl.
" Ossipee	" J. A. Rodgers	" Scott.
" **Ossipee**	" **J. A. Rodgers**	" **J. A. Rodgers.**
" **Ossipee**	" **J. A. Rodgers**	" **J. A. Rodgers.**
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Ossipee	Lt. J. A. Rodgers	Lt. Scott.
" Ossipee	" J. A. Rodgers	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
" **Quinneba'g**	" **W. P. Day**	" **W. P. Day.**
" Juniata	" E. H. C. Leutze	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 21, 1884	38° 24′	24° 20′ W.	23° 09′ W.
July 15, 1884	38 24	71 45 W.	7 17 W.
Oct. 30, 1884	38 25	9 20 W.	19 22 W.
June 2, 1884	38 26	14 13 E.	11 12 W.
July 8, 1884	**38 41**	**6 10 E.**	**13 03 W.** *b*
June 3, 1884	38 44	11 24 E.	11 34 W.
July 14, 1884	38 48	71 24 W.	8 21 W.
Feb. 21, 1884	**38 50**	**15 25 E.**	**9 53 W.** *a*
July 15, 1884	38 51	71 34 W.	8 48 W.
Dec. 5, 1883	38 52	54 38 W.	19 13 W.
Jan. 26, 1883	38 52	6 18 E.	13 50 W.
Sept. 20, 1883	**38 53**	**10 19 W.**	**18 15 W.** *a*
July 27, 1881	**38 56**	**17 32 E.**	**10 02 W.** *b*
July 15, 1884	38 57	71 31 W.	8 47 W.
May 15, 1884	38 59	25 15 E.	5 54 W.
Dec. 6, 1883	39 00	51 36 W.	20 45 W.
Dec. 9, 1883	39 00	44 27 W.	22 57 W.
July 17, 1884	39 10	71 28 W.	8 33 W.
Nov. 18, 1884	**39 10**	**3 24 E.**	**14 24 W.** *a*
July 20, 1883	39 11	73 46 W.	7 07 W.
May 27, 1884	39 12	73 53 W.	7 16 W.
July 12, 1884	39 15	71 31 W.	8 44 W.
July 17, 1884	39 15	71 11 W.	9 16 W.

a=Mean of observations on 16 equidistant points.
b= " " " " 32 " "

From 35° North to 40° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Ossipee	Lt. J. A. Rodgers	Lt. Scott.
" Tennessee	" S. W. Very	" Scott.
" Lancaster	" H. N. Manney	" Diehl.
" Quinnebaug	" W. P. Day	" Scott.
" **Richmond**	**Lt. Com. E. S. Houston**	**Lt. Com. Houston.**
" Quinnebaug	Lt. W. P. Day	Lt. Scott.
" Tennessee	" S. W. Very	" Scott.
" **Trenton**	" **Asa Walker**	" **A. Walker.**
" Tennessee	" S. W. Very	" Scott.
" Trenton	" Asa Walker	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" **Kearsarge**	" **A. Dunlap**	" **A. Dunlap.**
" **Trenton**	**Lt. Com. T. A. Lyons**	**Lt. Com. Lyons.**
" Tennessee	Lt. S. W. Very	Lt. Scott.
" Quinnebaug	" W. P. Day	" Scott.
" Trenton	" Asa Walker	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" **Lancaster**	" **H. N. Manney**	" **H. N. Manney.**
" Vandalia	" C. Belknap	Lt. Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Tennessee	" S. W. Very	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 19, 1883	39° 20′	11° 17′ W.	18° 03′ W.
July 14, 1884	39 23	70 58 W.	8 33 W.
July 12, 1884	39 30	71 53 W.	9 04 W.
July 18, 1884	39 30	71 02 W.	8 48 W.
July 19, 1883	39 31	64 18 W.	14 20 W.
July 18, 1884	39 31	71 49 W.	8 39 W.
Oct. 11, 1884	39 34	9 56 W.	19 30 W.
Sept. 11, 1883	39 38	25 26 W.	22 50 W.
Sept. 19, 1883	39 40	11 57 W.	20 17 W.
Aug. 29, 1883	39 43	56 02 W.	18 05 W.
Aug. 25, 1883	39 45	63 30 W.	12 50 W.
Aug. 26, 1883	39 45	60 52 W.	14 52 W.
Aug. 27, 1883	39 53	59 27 W.	17 53 W.
July 18, 1884	**39 55**	**70 37 W.**	**12 17 W.** *a*
Sept. 7, 1883	39 57	32 48 W.	25 27 W.
July 10, 1884	39 58	72 59 W.	8 08 W.
Sept. 9, 1883	39 59	28 58 W.	24 42 W.

a = Mean of observations on 16 equidistant points.

From 35° North to 40° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Kearsarge	Lt. A. Dunlap	Lt. Diehl.
" Tennessee	" S. W. Very	" Scott.
" Vandalia	" C. Belknap	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Jamestown	" R. G. Davenport	" Scott.
" Swatara	" R. B. Peck	" Scott.
" Lancaster	" H. N. Manney	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" **Alliance**	" **J. C. Rich**	" **Scott.**
" Kearsarge	" A. Dunlap	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Kearsarge	" A. Dunlap	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 18, 1884	**40° 00′**	**70° 36′ W.**	**11° 01′ W.** *a*
July 18, 1884	**40 00**	**70 33 W.**	**10 43 W.** *a*
July 5, 1884	40 00	12 16 E.	10 58 W.
Sept. 2, 1883	40 00	42 24 W.	25 59 W.
Sept. 7, 1883	40 00	33 58 W.	26 25 W.
Sept. 8, 1883	40 00	30 18 W.	25 10 W.
July 10, 1884	40 01	73 06 W.	8 09 W.
Sept. 3, 1883	40 01	41 21 W.	25 51 W.
Dec. 7, 1883	40 02	46 48 W.	23 46 W.
Sept. 4, 1883	40 07	40 57 W.	25 22 W.
Sept. 5, 1883	40 07	38 11 W.	25 45 W.
Sept. 5, 1883	40 07	37 22 W.	25 57 W.
Sept. 6, 1883	40 09	35 37 W.	25 04 W.
Sept. 1, 1883	**40 12**	**44 12 W.**	**24 52 W.** *a*
Sept. 6, 1883	40 13	36 24 W.	26 35 W.
Sept. 12, 1883	40 13	25 08 W.	22 44 W.
Sept. 15, 1883	40 17	21 44 W.	22 59 W.
Sept. 18, 1883	40 17	13 59 W.	21 00 W.
Sept. 13, 1883	40 18	24 22 W.	23 34 W.
Sept. 14, 1883	40 18	22 20 W.	22 40 W.
Sept. 14, 1883	40 19	22 55 W.	24 19 W.
Dec. 1, 1883	**40 21**	**73 52 W.**	**7 07 W.** *a*
Dec. 2, 1883	40 21	70 07 W.	11 06 W.

a = Mean of observations on 16 equidistant points.

From 40° North to 45° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Vandalia	Lt. C. Belknap	Lt. C. Belknap.
" Tennessee	" S. W. Very	" S. W. Very.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Kearsarge	Lt. A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Tennessee	" S. W. Very	" Scott.
" Kearsarge	" A. Dunlap	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" A. Dunlap.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
" Trenton	" Asa Walker	" A. Walker.
" Trenton	" Asa Walker	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 8, 1884	40° 22′	71° 24′ W.	10° 14′ W.
Aug. 22, 1883	40 23	71 28 W.	8 30 W.
Aug. 22, 1883	40 24	71 50 W.	8 09 W.
May 1, 1884	**40 26**	**73 51 W.**	**7 00 W.** *a*
Aug. 21, 1883	**40 27**	**73 53 W.**	**5 58 W.** *a*
Aug. 23, 1883	40 28	70 38 W.	8 58 W.
Dec. 10, 1883	40 29	43 53 W.	23 49 W.
Aug. 24, 1883	**40 29**	**73 51 W.**	**7 16 W.** *b*
July 17, 1884	**40 30**	**73 50 W.**	**7 34 W.** *c*
July 12, 1881	40 30	13 08 E.	12 45 W.
Sept. 17, 1883	40 33	15 40 W.	19 41 W.
Aug. 26, 1883	40 34	72 47 W.	8 41 W.
April 15, 1881	**40 35**	**4 50 E.**	**14 05 W.** *b*
Oct. 14, 1883	40 42	74 00 W.	8 24 W.
July 28, 1883	40 47	70 56 W.	10 57 W.
July 14, 1881	40 48	18 06 E.	9 57 W.
May 3, 1884	40 50	68 33 W.	13 19 W.
Dec. 15, 1883	40 51	29 05 W.	26 47 W.
Aug. 13, 1883	40 54	3 41 E.	14 28 W.
Dec. 11, 1883	40 55	40 23 W.	26 36 W.
July 19, 1884	41 00	69 26 W.	13 13 W.
May 3, 1884	41 00	67 42 W.	13 31 W.
Oct. 8, 1883	41 08	72 09 W.	8 35 W.

a = Mean of observations on 16 equidistant points.
b = " " " " 32 " "
c = " " " " 28 " "

From 40° North to 45° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Jamestown	Lt. R. G. Davenport	Lt. Scott.
" Kearsarge	" A. Dunlap	" Diehl.
" Kearsarge	" A. Dunlap	" Diehl.
G. R. S. Thetis	" **U. Sebree**	" **U. Sebree.**
U. S. S. Kearsarge	" **A. Dunlap**	" **A. Dunlap.**
" Kearsarge	" A. Dunlap	" Diehl.
" Trenton	" Asa Walker	" Diehl.
" **Swatara**	" **R. B. Peck**	" **R. B. Peck.**
" **Swatara**	" **R. B. Peck**	" **Scott.**
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Kearsarge	Lt. A. Dunlap	" Diehl.
" Swatara	" R. B. Peck	" Scott.
" **Trenton**	**Lt. Com. T. A. Lyons**	**Lt. Com. Lyons.**
" Vandalia	Lt. C. Belknap	Lt. Diehl.
" Vandalia	" C. Belknap	" Diehl.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
G. R. S. Thetis	Lt. U. Sebree	" Diehl.
U. S. S. Trenton	" Asa Walker	" Diehl.
" Lancaster	Lt. Com. J. M. Forsyth	" Scott.
" Trenton	Lt. Asa Walker	" Diehl.
" Vandalia	" C. Belknap	" Diehl.
G. R. S. Thetis	" U. Sebree	" Diehl.
U. S. S. Vandalia	" C. Belknap	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Feb. 3, 1884	**41° 15′**	**12° 51′ E.**	**11° 23′ W.** *a*
July 31, 1881	41 15	12 46 E.	11 50 W.
May 13, 1884	**41 18**	**66 17 W.**	**15 18 W.** *d*
July 29, 1883	41 18	66 41 W.	14 33 W.
Sept. 8, 1881	41 22	4 10 E.	15 30 W.
June 10, 1883	**41 29**	**70 12 W.**	**11 38 W.** *a*
Nov. 17, 1884	**41 30**	**71 19 W.**	**10 52 W.** *b*
Nov. 17, 1884	**41 30**	**71 19 W.**	**10 50 W.** *b*
May 4, 1884	41 30	65 40 W.	15 10 W.
July 21, 1884	41 42	69 11 W.	13 22 W.
Sept. 24, 1883	41 50	63 27 W.	16 32 W.
May 4, 1884	42 00	64 21 W.	18 29 W.
Feb. 5, 1884	**42 05**	**11 45 E.**	**11 19 W.** *c*
Oct. 18, 1884	**42 20**	**70 47 W.**	**11 31 W.** *a*
June 16, 1883	42 23	66 33 W.	17 48 W.
May 5, 1884	42 34	62 12 W.	18 47 W.
July 26, 1881	42 38	15 42 E.	10 20 W.
Aug. 28, 1883	42 40	67 10 W.	15 44 W.
July 31, 1884	42 40	67 51 W.	14 46 W.
July 31, 1884	42 45	67 42 W.	14 51 W.
July 20, 1884	42 46	69 53 W.	13 56 W.
May 5, 1884	42 50	60 50 W.	20 47 W.
July 21, 1884	42 54	70 22 W.	12 19 W.

a = Mean of observations on 16 equidistant points.

b = Mean of 10 observations taken on shore.

c = Mean of observations on 24 equidistant points.

d = Mean of two sets of observations on 16 equidistant points.

From 40° North to 45° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Lancaster	**Lt. Com. J. M. Forsyth**	**Lt. Com. Forsyth.**
" Trenton	" T. A. Lyons	Lt. Com. Lyons.
G. R. S. Alert	**Lt. C. J. Badger**	**Lt. Diehl.**
U. S. S. Vandalia	" C. Belknap	" Diehl.
" Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" **Yantic**	**Lt. E. S. Prime**	**Lt. E. S. Prime.**
------ ------ ------	**Lt. Com. T. A. Lyons**	**Lt. Com. Lyons.**
------ ------ ------	**Lt. John Hubbard**	**Lt. Hubbard.**
G. R. S. Thetis	" U. Sebree	" Diehl.
U. S. S. Swatara	" R. B. Peck	" Scott.
" Yantic	" E. S. Prime	" Scott.
G. R. S. Thetis	" U. Sebree	" Diehl.
U. S. S. Kearsarge	" **W. Doty**	" **W. Doty.**
" **Powhatan**	" **C. C. Cornwell**	" **C. C. Cornwell.**
" Yantic	" E. S. Prime	" Scott.
G. R. S. Thetis	" U. Sebree	" Diehl.
U. S. S. Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
" Swatara	Lt. R. B. Peck	Lt. Scott.
G. R. S. Alert	" C. J. Badger	" Diehl.
" Thetis	" U. Sebree	" Diehl.
U. S. S. Tennessee	" S. W. Very	" Scott.
G. R. S. Thetis	" U. Sebree	" Diehl.
U. S. S. Tennessee	" S. W. Very	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 6, 1884	43° 20′	58° 40′ W.	24° 48′ W.
July 15, 1881	43 28	14 57 E.	10 48 W.
July 29, 1884	43 42	62 51 W.	19 12 W.
Sept. 22, 1883	43 48	57 37 W.	21 57 W.
July 30, 1883	43 50	61 27 W.	19 47 W.
June 18, 1883	44 04	58 43 W.	25 40 W.
Sept. 24, 1883	44 06	64 04 W.	20 07 W.
July 29, 1884	44 08	61 32 W.	21 21 W.
July 29, 1884	44 13	61 33 W.	20 58 W.
Sept. 24, 1883	44 39	63 35 W.	22 39 W.
Sept. 15, 1883	44 49	61 56 W.	21 56 W.

From 40° North to 45° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis	Lt. U. Sebree	Lt. Diehl.
U. S. S. Trenton	Lt. Com. T. A. Lyons	Lt. Com. Lyons.
G. R. S. Thetis	Lt. U. Sebree	Lt. Diehl.
U. S. S. Yantic	" E. S. Prime	" Scott.
" Vandalia	" C. Belknap	" Hubbard.
" Yantic	" E. S. Prime	" Scott.
" Vandalia	" C. Belknap	" Hubbard.
G. R. S. Thetis	" U. Sebree	" Diehl.
" Alert	" C. J. Badger	" Diehl.
U. S. S. Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Sept. 15, 1883	45° 00′	61° 25′ W.	23° 40′ W.
June 19, 1883	45 02	55 59 W.	29 21 W.
July 28, 1884	45 09	57 24 W.	25 18 W.
May 7, 1884	45 10	55 05 W.	28 31 W.
July 28, 1884	45 20	57 26 W.	23 29 W.
Sept. 7, 1883	45 29	61 02 W.	23 52 W.
Sept. 3, 1883	45 30	73 33 W.	11 49 W.
Sept. 12, 1883	45 33	61 02 W.	22 51 W.
July 27, 1884	45 40	55 25 W.	28 02 W.
Sept. 3, 1883	45 47	73 20 W.	12 25 W.
Sept. 14, 1883	45 50	62 42 W.	22 02 W.
July 27, 1884	45 57	55 25 W.	26 48 W.
May 8, 1884	46 00	53 43 W.	29 06 W.
Sept. 9, 1883	46 01	61 36 W.	23 14 W.
Aug. 23, 1883	46 03	73 01 W.	14 04 W.
July 27, 1884	46 08	54 15 W.	28 39 W.
Aug. 29, 1883	**46 10**	**62 18 W.**	**24 02 W.** *a*
Sept. 22, 1883	**46 10**	**62 27 W.**	**24 19 W.** *b*
Aug. 23, 1883	46 13	72 47 W.	14 08 W.
Aug. 1, 1883	46 32	56 46 W.	27 38 W.
Sept. 3, 1883	46 45	72 20 W.	15 55 W.
Sept. 5, 1883	46 48	71 12 W.	17 44 W.
Jan. 27, 1880	**46 50**	**8 14 W.**	**21 10 W.** *c*

a = Mean of observations on 16 equidistant points.
b = " " " " 8 " "
c = " " " " 32 " "

From 45° North to 50° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Vandalia	Lt. C. Belknap	Lt. Hubbard.
" Yantic	" E. S. Prime	" Scott.
G. R. S. Thetis	" U. Sebree	" Diehl.
" Thetis	" U. Sebree	" Diehl.
" Alert	" C. J. Badger	" Diehl.
U. S. S. Swatara	" R. B. Peck	" Scott.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
G. R. S. Thetis	" U. Sebree	" Diehl.
U. S. S. Vandalia	" C. Belknap	" Hubbard.
" Swatara	" R. B. Peck	" Scott.
G. R. S. Alert	" C. J. Badger	" Diehl.
" Thetis	" U. Sebree	" Diehl.
U. S. S. Swatara	" R. B. Peck	" Scott.
" Vandalia	" C. Belknap	" Hubbard.
G. R. S. Thetis	" U. Sebree	" Diehl.
U. S. S. Alliance	" **J. C. Rich**	" **J. C. Rich.**
" **Swatara**	" **R. B. Peck**	" **R. B. Peck.**
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" **Trenton**	**Lt. Com. T. A. Lyons**	**Lt. Com. Lyons.**

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 8, 1884	46° 52′	52° 50′ W.	29° 00′ W.
July 26, 1884	**46 57**	**52 44 W.**	**29 18 W.** *a*
July 26, 1884	**46 57**	**52 46 W.**	**30 16 W.** *a*
July 26, 1884	**46 57**	**52 46 W.**	**30 12 W.** *b*
Aug. 8, 1883	47 00	56 40 W.	26 57 W.
Aug. 9, 1883	47 03	59 13 W.	26 09 W.
Aug. 9, 1883	47 07	60 16 W.	27 42 W.
Aug. 10, 1883	47 10	61 25 W.	26 27 W.
Aug. 10, 1883	47 10	62 10 W.	26 50 W.
Aug. 9, 1883	47 13	60 25 W.	27 01 W.
Aug. 10, 1883	47 18	62 23 W.	26 15 W.
Aug. 14, 1883	47 21	70 16 W.	19 10 W.
Aug. 6, 1883	47 28	55 30 W.	27 24 W.
June 29, 1881	**47 34**	**52 35 W.**	**30 26 W.** *c*
Sept. 8, 1883	47 51	62 48 W.	26 43 W.
Sept. 6, 1883	47 57	69 35 W.	20 10 W.
May 23, 1884	48 05	51 26 W.	30 43 W.
Aug. 13, 1883	48 14	69 09 W.	20 51 W.
July 18, 1884	48 14	52 04 W.	34 43 W.
Aug. 11, 1883	48 36	63 30 W.	26 23 W.
Sept. 7, 1883	48 37	68 32 W.	23 33 W.
Sept. 8, 1883	48 43	63 53 W.	26 43 W.
Sept. 8, 1883	48 50	64 20 W.	25 14 W.

a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

c = Mean of 2 results obtained by swinging ship with starboard and port helm with observations on 32 and 16 equidistant points respectively.

From 45° North to 50° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis	Lt. U. Sebree	Lt. Diehl.
" **Bear**	" **F. H. Crosby**	" **F. H. Crosby.**
" **Thetis**	" **U. Sebree**	" **U. Sebree.**
" **Alert**	" **C. J. Badger**	" **C. J. Badger.**
U. S. S. Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" **Alliance**	" **C. P. Perkins**	" **Scott.**
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
G. R. S. Alert	" C. J. Badger	" Diehl.
U. S. S. Vandalia	" C. Belknap	" Hubbard.
G. R. S. Alert	" C. J. Badger	" Diehl.
U. S. S. Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 16, 1884	48° 52′	52° 07′ W.	34° 58′ W.
Sept. 7, 1883	**49 08**	**66 53 W.**	**25 00 W.** *a*
May 24, 1884	49 21	50 47 W.	34 43 W.
July 16, 1884	49 21	52 05 W.	35 06 W.
Aug. 11, 1883	49 34	64 11 W.	27 56 W.
Aug. 12, 1883	49 50	68 20 W.	24 48 W.

a = Mean of observations on 16 equidistant points.

From 45° North to 50° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis	Lt. U. Sebree	Lt. Diehl.
U. S. S. Vandalia	" C. Belknap	" C. Belknap.
G. R. S. Alert	" C. J. Badger	" Diehl.
" Alert	" C. J. Badger	" Diehl.
U. S. S. Vandalia	" C. Belknap	" Hubbard.
" Vandalia	" C. Belknap	" Hubbard.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 30, 1883	50° 19′	50° 49′ W.	36° 00′ W.
July 2, 1883	51 30	50 46 W.	36 50 W.
July 15, 1884	51 40	53 12 W.	35 30 W.
July 15, 1884	51 50	53 10 W.	38 11 W.
May 15, 1884	53 24	51 20 W.	41 15 W.
May 27, 1884	54 08	50 29 W.	38 43 W.
July 3, 1883	54 25	50 30 W.	42 38 W.

From 50° North to 55° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Yantic	Lt. E. S. Prime	Lt. Scott.
" Yantic	" E. S. Prime	" Scott.
G. R. S. Thetis	" U. Sebree	" Diehl.
" Alert	" C. J. Badger	" Diehl.
" Thetis	" U. Sebree	" Diehl.
" Alert	" C. J. Badger	" Diehl.
U. S. S. Yantic	" E. S. Prime	" Scott.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 16, 1884	55° 50′	51° 40′ W.	43° 59′ W.
July 13, 1884	55 56	54 06 W.	42 43 W.
July 4, 1883	56 03	50 55 W.	44 26 W.
June 29, 1883	56 04	16 16 E.	9 53 W.
May 28, 1884	56 11	49 42 W.	40 59 W.
Sept. 10, 1883	56 34	52 24 W.	48 50 W.
July 13, 1884	57 07	54 30 W.	44 46 W.
July 13, 1884	57 08	54 21 W.	45 36 W.
June 29, 1883	57 53	18 03 E.	9 22 W.
June 28, 1883	58 30	18 34 E.	9 21 W.
June 12, 1884	**58 34**	**135 10 W.**	**30 31 E.** *a*
July 12, 1884	58 48	54 33 W.	46 19 W.
July 12, 1884	58 50	54 36 W.	48 28 W.
May 17, 1884	58 51	52 22 W.	49 51 W.
June 21, 1883	59 20	22 34 E.	5 42 W.
July 12, 1884	59 50	54 45 W.	51 42 W.
July 12, 1884	59 51	54 48 W.	49 11 W.
July 12, 1884	59 52	54 46 W.	47 14 W.
June 19, 1883	**59 59**	**29 46 E.**	**1 15 W.** *a*

a = Mean of observations on 32 equidistant points.

From 55° North to 60° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis	Lt. U. Sebree	Lt. Diehl.
" Thetis	" U. Sebree	" Diehl.
U. S. S. Yantic	" E. S. Prime	" Scott.
" Lancaster	Lt. Com. J. M. Forsyth	" Scott.
G. R. S. Alert	Lt. C. J. Badger	" Diehl.
U. S. S. Yantic	" E. S. Prime	" Scott.
G. R. S. Bear	" F. H. Crosby	" Scott.
" Thetis	" U. Sebree	" Diehl.
U. S. S. Lancaster	Lt. Com. J. M. Forsyth	" Scott.
" Lancaster	" J. M. Forsyth	" Scott.
" **Adams**	**Lt. D. Delehanty**	" **D. Delehanty.**
G. R. S. Thetis	" U. Sebree	" Diehl.
" Alert	" C. J. Badger	" Diehl.
" Thetis	" U. Sebree	" Diehl.
U. S. S. Lancaster	Lt. Com. J. M. Forsyth	" Scott.
G. R. S. Alert	Lt. C. J. Badger	" Diehl.
" Bear	" F. H. Crosby	" Diehl.
" Thetis	" U. Sebree	" Diehl.
U. S. S. Lancaster	**Lt. Com. J. M. Forsyth**	**Lt. Com. Forsyth.**

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 18, 1884	**60° 25′**	**52° 45′ W.**	**50° 03′ W.** *a*
May 18, 1884	61 09	53 09 W.	52 21 W.
Sept. 8, 1884	61 30	56 48 W.	53 05 W.
July 11, 1884	61 37	55 00 W.	49 56 W.
July 11, 1884	62 50	55 14 W.	54 21 W.
July 11, 1884	62 50	55 15 W.	56 32 W.
May 19, 1884	62 57	53 30 W.	54 41 W.
July 11, 1884	63 12	55 23 W.	54 39 W.
July 15, 1881	**64 12**	**22 10 W.**	**36 53 W.** *b*
July 10, 1884	64 40	55 00 W.	61 27 W.
July 10, 1884	64 51	55 08 W.	62 03 W.
July 10, 1884	64 53	54 59 W.	61 56 W.

92

a = Mean of observations on 16 equidistant points.

b = Mean of two sets of observations on 28 equidistant points; starboard and port helm.

From 60° North to 65° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis	**Lt. U. Sebree**	**Lt. Sebree.**
" Thetis	" U. Sebree	" Diehl.
U. S. S. Yantic	" E. S. Prime	" Scott.
G. R. S. Thetis	" U. Sebree	" Diehl.
" Thetis	" U. Sebree	" Diehl.
" Alert	" C. J. Badger	" Diehl.
" Thetis.	" U. Sebree	" Diehl.
" Bear	" F. H. Crosby	" Diehl.
U. S. S. Alliance	" **C. P. Perkins**	" **Scott.**
G. R. S. Thetis	" U. Sebree	" Diehl.
" Bear	" F. H. Crosby	" Diehl.
" Alert	" C. J. Badger	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 20, 1884	65° 07′	54° 06′ W.	62° 27′ W.
July 10, 1884	66 04	55 04 W.	63 47 W.
July 10, 1884	66 05	55 00 W.	63 01 W.
July 8, 1883	66 26	54 36 W.	64 26 W.
June 3, 1884	67 19	54 45 W.	65 58 W.
May 21, 1884	67 40	54 20 W.	63 43 W.
July 9, 1884	**67 57**	**54 34 W.**	**66 22 W.** *a*
July 9, 1884	67 57	55 35 W.	66 26 W.
July 9, 1884	68 00	54 34 W.	67 27 W.
July 9, 1884	**68 02**	**54 32 W.**	**65 29 W.** *b*
May 21, 1884	68 19	54 25 W.	65 54 W.
July 9, 1884	69 04	53 32 W.	65 09 W.
July 8, 1884	69 14	53 24 W.	65 35 W. *c*
June 9, 1884	**69 25**	**54 45 W.**	**68 44 W.** *d*

a = Mean of observations on 16 equidistant points.
b = " " " " 32 " "
c = Determined by compass on shore.
d = Mean of 2 sets of observations on 16 equidistant points; starboard and port helm.

From 65° North to 70° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis	Lt. U. Sebree	Lt. Diehl.
" Alert	" C. J. Badger	" Diehl.
" Thetis	" U. Sebree	" Diehl.
U. S. S. Yantic	" E. S. Prime	" Scott.
G. R. S. Alert	" C. J. Badger	" Diehl.
" Thetis	" U. Sebree	" Diehl.
" **Thetis**	" **U. Sebree**	" **Sebree.**
" Thetis	" U. Sebree	" Diehl.
" Alert	" C. J. Badger	" Diehl.
" **Bear**	" **F. H. Crosby**	" **Scott.**
" Thetis	" U. Sebree	" Diehl.
" Thetis	" U. Sebree	" Diehl.
" Thetis	" U. Sebree	" Diehl.
" **Alert**	" **C. J. Badger**	" **Diehl.**

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 4, 1884	70° 00′	55° 18′ W.	68° 45′ W.
May 25, 1884	70 05	55 00 W.	68 52 W.
May 25, 1884	70 10	55 20 W.	71 28 W.
May 25, 1884	70 40	54 40 W.	64 29 W.
July 29, 1881	**70 48**	**23 40 E.**	**4 09 W.** *a*
July 4, 1884	71 20	55 50 W.	72 09 W.
July 27, 1883	**71 25**	**55 48 W.**	**71 39 W.** *b*
May 27, 1884	**72 12**	**55 07 W.**	**65 18 W.** *c*
May 31, 1884	**72 57**	**56 13 W.**	**73 57 W.** *d*
June 7, 1884	74 01	57 47 W.	75 12 W.
June 13, 1884	74 10	58 25 W.	79 06 W. *e*
July 1, 1884	74 13	57 39 W.	77 30 W. *e*

a = Mean of two sets of observations on 32 equidistant points; starboard and port helm.

b = Mean of two sets of observations on 16 equidistant points; starboard and port helm.

c = Mean of observations on 16 equidistant points.

d = " " " " 28 " "

e = Determined by compass on ice, clear of ship.

From 70° North to 75° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis	Lt. U. Sebree	Lt. Diehl.
" Thetis	" U. Sebree	" Diehl.
" Thetis	" U. Sebree	" Diehl.
" Thetis	" U. Sebree	" Diehl.
U. S. S. Alliance	" C. P. Perkins	" Scott.
G. R. S. Thetis	" U. Sebree	" Diehl.
U. S. S. Yantic	" E. S. Prime	" E. S. Prime.
G. R. S. Thetis	" U. Sebree	" Scott.
" Bear	" F. H. Crosby	" Scott.
" Thetis	" U. Sebree	" Diehl.
" Thetis	" U. Sebree	" Diehl.
" Thetis	" U. Sebree	" Diehl.

North Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 15, 1884	75° 01′	59° 50′ W.	83° 00′ W. *a*
June 16, 1884	75 30	63 30 W.	88 30 W. *a*
June 25, 1884	**77 15**	**71 30 W.**	**97 59 W.** *b*
June 25, 1884	**77 18**	**71 58 W.**	**100 34 W.** *c*
Aug., 1881	**79 37**	**11 15 W.**	**17 30 W.** *d*
Aug. 7, 1881	**79 54**	**7 30 E.**	**18 18 W.** *e*

a = Determined by compass on ice, clear of ship.
b = Mean of observations on 32 equidistant points.
c = " " " " 16 " "
d = Determined on shore.
e = Mean of two sets of observations on 32 equidistant points; starboard and port helm.

From 75° North to 80° North.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
G. R. S. Thetis	Lt. U. Sebree	Lt. Diehl.
" Thetis	" U. Sebree	" Diehl.
" Bear	" F. H. Crosby	" Scott.
" Thetis	" U. Sebree	" U. Sebree.
U. S. S. Alliance	" C. P. Perkins	" C. P. Perkins.
" Alliance	" C. P. Perkins	" Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 1, 1883.	0° 07′	129° 38′ W.	8° 06′ E.
June 1, 1883	0 22	129 04 W.	8 24 E.
Aug. 2, 1883	0 50	127 22 W.	5 47 E.
Dec. 23, 1882	0 52	81 15 W.	7 51 E.
May 23, 1884.	0 52	59 13 E.	2 11 W.
May 31, 1883.	0 53	128 03 W.	7 24 E.
July 31, 1883	1 00	30 49 W.	14 59 W.
Sept. 24, 1883	**1 03**	**105 02 E.**	**1 23 E.** *a*
Dec. 3, 1884	1 07	29 04 W.	16 22 W.
May 31, 1883	**1 10**	**127 27 W.**	**7 36 E.** *b*
Feb. 18, 1883	1 14	27 14 W.	17 21 W.
Dec. 3, 1884	1 30	28 27 W.	17 00 W.
July 31, 1883	1 34	30 40 W.	16 15 W.
May 30, 1883	**1 41**	**126 22 W.**	**7 36 E.** *b*
Jan. 19, 1883	1 49	81 11 W.	7 26 E.
May 30, 1883	**1 50**	**125 45 W.**	**7 23 E.** *c*
April 6, 1882	1 53	7 40 W.	19 00 W.
Aug. 1, 1883	2 08	126 18 W.	6 28 E.
May 29, 1883	2 16	124 18 W.	7 03 E.
Dec. 2, 1884	2 24	27 23 W.	18 05 W.
May 29, 1883	2 30	123 20 W.	7 33 E.
Dec. 2, 1884	2 46	26 46 W.	17 49 W.
May 28, 1883	2 49	121 42 W.	7 06 E.

100

a = Mean of observations on 8 equidistant points.

b = " " " " 28 " "

c = Mean of seven observations.

From the Equator to 5° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. Diehl.
" Essex	" W. H. Parker	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Essex	" W. H. Parker	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Essex	" W. Kellogg	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. H. Parker	" W. H. Parker.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. Kellogg	" Scott.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. Kellogg	" Scott.
" Essex	" W. H. Parker	" Hubbard.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 30, 1883	**2° 50′**	**98° 00′ E.**	**1° 30′ E.** *a*
July 30, 1883	2 53	30 55 W.	16 48 W.
May 22, 1884	2 54	60 31 E.	2 47 W.
Aug. 30, 1883	**3 04**	**98 26 E.**	**1 33 E.** *a*
May 28, 1883	3 04	120 40 W.	7 20 E.
May 22, 1884	**3 14**	**60 47 E.**	**1 26 W.** *b*
Sept. 12, 1884	**3 17**	**106 11 E.**	**2 33 E.** *c*
May 27, 1883	3 39	118 51 W.	6 32 E.
Dec. 21, 1882	3 41	81 50 W.	7 56 E.
May 21, 1884	3 44	61 31 E.	2 56 W.
March 11, 1885	3 44	81 26 W.	7 32 E.
Feb. 20, 1883	3 47	28 39 W.	15 53 W.
Dec. 1, 1884	**3 49**	**24 52 W.**	**18 13 W.** *c*
July 31, 1883	3 49	123 29 W.	6 02 E.
July 30, 1883	3 50	31 13 W.	16 18 W.
May 27, 1883	4 00	117 54 W.	7 38 E.
April 7, 1884	4 01	27 46 W.	18 24 W.
May 26, 1883	4 30	116 10 W.	6 59 E.
Nov. 30, 1884	4 35	23 38 W.	18 18 W.
July 30, 1883	4 40	122 00 W.	6 21 E.
April 6, 1884	4 50	26 10 W.	19 30 W.
May 26, 1883	4 50	115 15 W.	8 22 E.
Nov. 30, 1884	4 57	23 00 W.	18 16 W.

a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

c = " " " " 4 " "

From the Equator to 5° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Enterprise	**Lt. G. A. Norris**	**Lt. G. A. Norris.**
" Galena	" H. W. Lyon	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" **Enterprise**	" **G. A. Norris**	" **G. A. Norris.**
" Essex	" W. H. Parker	" Hubbard.
" **Richmond**	**Lt. Com. E. S. Houston**	**Lt. Com. Houston.**
" **Essex**	**Lt. W. H. Parker**	**Lt. Diehl.**
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Wachusett	Lt. B. S. Richards	" Scott.
" Enterprise	" G. A. Norris	" Hubbard.
" **Essex**	" **W. Kellogg**	" **W. Kellogg.**
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. Kellogg	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. Kellogg	" Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Feb. 21, 1883	4° 58′	29° 43′ W.	15 31 W.
July 29, 1883	4 59	31 42 W.	16 29 W.

From the Equator to 5° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Enterprise	Lt. G. A. Norris	Lt. Hubbard.
" Galena	" H. W. Lyon	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 30, 1883	5° 08′	121° 12′ W.	6° 13′ E.
Sept. 6, 1883	5 10	106 24 E.	2 00 E.
May 20, 1884	5 18	64 00 E.	2 15 W.
May 25, 1883	5 22	113 21 W.	7 39 E.
July 29, 1883	5 22	32 01 W.	15 49 W.
Feb. 1, 1884	**5 25**	**81 23 W.**	**8 28 E.** *a*
May 25, 1883	5 30	112 45 W.	7 25 E.
Nov. 29, 1884	5 45	21 39 W.	19 17 W.
July 29, 1883	5 52	118 54 W.	7 36 E.
May 24, 1883	6 00	111 19 W.	8 08 E.
April 15, 1882	6 01	19 58 W.	18 52 W.
Jan. 31, 1884	6 12	81 26 W.	8 36 E.
Nov. 29, 1884	6 13	21 16 W.	19 17 W.
May 24, 1883	**6 13**	**110 39 W.**	**8 18 E.** *a*
May 19, 1884	6 18	65 42 E.	2 15 W.
July 28, 1883	6 18	117 03 W.	7 44 E.
Feb. 22, 1883	6 21	30 51 W.	15 20 W.
July 28, 1883	6 24	116 25 W.	7 53 E.
May 23, 1883	**6 32**	**109 21 W.**	**9 00 E.** *a*
April 4, 1884	6 36	22 28 W.	20 20 W.
July 28, 1883	6 38	32 09 W.	15 01 W.
May 23, 1883	6 39	108 33 W.	8 36 E.
Sept. 16, 1884	6 40	104 19 E.	3 22 E.

a = Mean of observations on 8 equidistant points.

From 5° South to 10° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Pensacola	Lt. F. Hanford	Lt. Diehl.
" Juniata	" E. H. C. Leutze	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Hubbard.
" Galena	" H. W. Lyon	" Diehl.
" **Lackaw'na**	" **J. M. Miller**	" **J. M. Miller.**
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. Kellogg	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Hubbard
" Lackawa'na	" J. M. Miller	" Diehl.
" Essex	" W. Kellogg	" Scott.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Pensacola	Lt. F. Hanford	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" **Essex**	" **W. H. Parker**	" **Diehl.**
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 27, 1883	6° 42′	113° 57′ W.	7° 25′ E.
May 18, 1884	6 47	66 16 E.	2 16 W.
Jan. 30, 1884	6 50	81 16 W.	8 55 E.
Nov. 28, 1884	7 07	19 36 W.	19 18 W.
July 25, 1883	7 19	109 23 W.	7 19 E.
May 2, 1884	7 20	102 20 E.	1 47 E.
March 9, 1885	7 21	80 51 W.	8 06 E.
Dec. 19, 1882	7 21	81 27 W.	9 45 E.
May 22, 1883	7 23	106 07 W.	9 13 E.
July 24, 1883	**7 26**	**107 38 W.**	**7 20 E.** *a*
Nov. 28, 1884	7 31	19 12 W.	19 52 W.
July 23, 1883	7 41	104 58 W.	8 05 E.
May 17, 1884	7 43	67 54 E.	2 26 W.
Sept. 17, 1884	7 44	101 24 E.	3 24 E.
May 4, 1884	7 44	96 56 E.	1 51 E.
April 2, 1884	**7 45**	**19 20 W.**	**21 48 W.** *a*
May 21, 1883	7 49	104 10 W.	10 16 E.
May 21, 1883	7 54	103 20 W.	9 02 E.
May 5, 1884	7 56	94 37 E.	0 54 W.
May 6, 1884	7 56	92 07 E.	0 50 W.
May 6, 1884	**7 56**	**91 15 E.**	**0 49 W.** *b*
Dec. 20, 1883	**7 57**	**41 47 E.**	**9 33 W.** *c*
July 22, 1883	8 01	101 35 W.	9 15 E.

a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

c = Mean of two sets of observations on 8 equidistant points.

From 5° South to 10° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Pensacola	Lt. F. Hanford	Lt. Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Lackawa'na	Lt. J. M. Miller	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Wachusett	Lt. B. S. Richards	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" **Pensacola**	" **F. Hanford**	" **F. Hanford.**
" Essex	" W. Kellogg	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	Lt. W. H. Parker	" Scott.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" **Pensacola**	" **F. Hanford**	" **F. Hanford.**
" Essex	" W. H. Parker	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Richmond	" E S. Houston	" Diehl.
" **Richmond**	" **E. S. Houston**	" **Hubbard.**
" **Brooklyn**	**Lt. E. W. Watson**	" **E. W. Watson.**
" Pensacola	" F. Hanford	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 20, 1883	8° 08′	101° 44′ W.	9° 27′ E.
Feb. 23, 1883	8 09	31 13 W.	14 25 W.
May 20, 1883	8 11	100 45 W.	9 34 E.
July 21, 1883	8 21	98 50 W.	9 38 E.
Nov. 27, 1884	8 27	17 44 W.	21 34 W.
May 16, 1884	8 30	69 12 E.	2 16 W.
May 19, 1883	8 30	99 03 W.	10 09 E.
Dec. 24, 1883	8 31	102 38 E.	1 43 E.
May 19, 1883	8 32	98 20 W.	10 09 E.
Feb. 25, 1885	8 34	79 46 W.	8 27 E.
July 20, 1883	8 34	95 59 W.	9 44 E.
Dec. 19, 1883	**8 44**	**43 29 E.**	**9 33 W.** *a*
Jan. 27, 1884	8 49	80 39 W.	10 06 E.
May 8, 1884	8 50	85 58 E.	0 55 W.
Dec. 24, 1883	8 50	101 58 E.	0 07 E.
May 18, 1883	8 51	96 33 W.	10 30 E.
May 15, 1884	8 59	70 06 E.	1 26 W.
Dec. 17, 1882	9 00	80 03 W.	9 53 E.
Aug. 26, 1884	**9 02**	**140 09 W.**	**7 10 E.** *a*
May 18, 1883	9 06	95 36 W.	10 28 E.
July 27, 1883	**9 11**	**33 36 W.**	**4 28 W.** *b*
March 8, 1885	9 17	79 25 W.	9 14 E.
March 31, 1884	9 19	16 20 W.	22 31 W.

a = Mean of observations on 32 equidistant points.

b = " " " " 24 " "

From 5° South to 10° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. Hubbard.
" Enterprise	" G. A. Norris	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Wachusett	" B. S. Richards	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" **Brooklyn**	" **E. W. Watson**	" **E. W. Watson.**
" Lackawa'na	" J. M. Miller	" Diehl.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Pensacola	Lt. F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" Pensacola	Lt. F. Hanford	" Diehl.
" **Iroquois**	" **F. W. Crocker**	" **Scott.**
" Essex	" W. H. Parker	" Hubbard.
" **Galena**	" **H. W. Lyon**	" **H. W. Lyon.**
" Wachusett	" B. S. Richards	" Scott.
" Pensacola	" F. Hanford	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 17, 1883	**9° 25′**	**93° 45′ W.**	**10 24 E.** *a*
Dec. 25, 1883	9 27	100 40 E.	1 13 E.
May 17, 1883	**9 36**	**93 05 W.**	**10 00 E.** *a*
May 14, 1884	9 42	74 24 E.	1 03 W.
May 13, 1884	**9 43**	**74 50 E.**	**2 39 W.** *b*
Dec. 16, 1882	9 50	79 19 W.	10 22 E.
Aug. 27, 1884	9 51	140 58 W.	7 12 E.
May 16, 1883	**9 51**	**91 53 W.**	**10 06 E.** *a*
Nov. 26, 1884	9 52	15 48 W.	22 03 W.
May 16, 1883	9 55	91 06 W.	10 48 E.
March 30, 1884	9 57	15 16 W.	22 40 W.

a = Mean of observations on 32 equidistant points.

b = " " " " 8 " "

From 5° South to 10° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	**Lt. W. H. Parker**	**Lt. W. H. Parker.**
" Pensacola	" F. Hanford	" Diehl.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" Richmond	Lt. Com. E. S. Houston	" Diehl.
" **Richmond**	**Lt. Com. E. S. Houston**	**Lt. Com. Houston.**
" Pensacola	" F. Hanford	Lt. Diehl.
" Iroquois	" F. W. Crocker	" Scott.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" Essex	" W. Kellogg	" Scott.
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 23, 1884	10° 02′	139° 00′ W.	7° 51′ E.
Feb. 26, 1885	10 04	78 48 W.	9 10 E.
Jan. 26, 1884	10 06	80 32 W.	10 10 E.
April 8, 1882	10 10	24 48 W.	17 22 W.
Dec. 26, 1883	10 11	98 30 E.	0 13 E.
Sept. 19, 1884	10 13	94 04 E.	1 39 E.
Feb. 24, 1883	10 25	32 14 W.	15 08 W.
May 14, 1883	**10 36**	**86 53 W.**	**10 00 E.** *a*
Aug. 22, 1884	10 37	137 41 W.	8 30 E.
Aug. 28, 1884	10 39	142 25 W.	7 52 E.
Dec. 27, 1883	10 43	96 36 E.	0 04 E.
July 26, 1883	10 44	34 44 W.	13 17 W.
March 29, 1884	10 44	14 05 W.	22 50 W.
May 13, 1883	**10 45**	**83 51 W.**	**10 42 E.** *b*
Aug. 21, 1884	10 48	135 56 W.	8 55 E.
Aug. 15, 1884	10 50	123 58 W.	7 19 E.
Aug. 17, 1884	10 52	128 39 W.	7 28 E.
Aug. 20, 1884	10 54	134 00 W.	8 15 E.
May 12, 1883	**10 55**	**82 16 W.**	**10 20 E.** *c*
March 7, 1885	10 56	78 19 W.	9 46 E.
Aug. 14, 1884	10 57	121 24 W.	8 03 E.
Aug. 18, 1884	10 58	129 50 W.	7 05 E.
Aug. 19, 1884	11 01	131 43 W.	7 34 E.

a = Mean of observations on 28 equidistant points.

b = Mean of 8 observations.

c = " " 16 "

From 10° South to 15° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Iroquois	Lt. F. W. Crocker	Lt. Scott.
" Wachusett	" B. S. Richards	" Scott.
" Lackawan'a	" J. M. Miller	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Scott.
" Enterprise	" G. A. Norris	" Hubbard.
" **Essex**	" **W. H. Parker**	" **W. H. Parker.**
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" **Essex**	" **W. H. Parker**	" **Hubbard.**
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" **Essex**	" **W. H. Parker**	" **Hubbard.**
" Wachusett	" B. S. Richards	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Aug. 11, 1884	11° 02′	113° 40′ W.	7° 58′ E.
Dec. 15, 1882	11 02	78 27 W.	10 19 E.
Aug. 8, 1884	11 13	106 45 W.	9 25 E.
Aug. 9, 1884	11 14	108 50 W.	9 03 E.
Sept. 20, 1884	11 20	90 38 E.	1 10 E.
Aug. 29, 1884	11 22	143 33 W.	7 24 E.
Aug. 6, 1884	11 27	103 22 W.	8 46 E.
Aug. 5, 1884	11 31	102 15 W.	9 22 E.
March 6, 1885	11 31	77 54 W.	9 11 E
July 28, 1884	11 33	87 04 W.	10 29 E.
July 30, 1884	11 33	90 47 W.	9 59 E.
Aug. 4, 1884	11 34	101 03 W.	8 57 E.
July 27, 1884	11 34	86 01 W.	10 48 E.
July 26, 1883	11 35	35 22 W.	12 32 W.
March 28, 1884	11 36	12 43 W.	23 06 W.
Aug. 2, 1884	11 37	98 24 W.	9 03 E.
July 31, 1884	11 47	93 49 W.	10 27 E.
Aug. 30, 1884	12 00	144 15 W.	7 56 E.
Dec. 14, 1882	**12 00**	**77 13 W.**	**9 40 E.** *a*
Sept. 22, 1884	12 00	83 46 E.	0 01 W.
Sept. 25, 1884	12 07	74 14 E.	2 22 W.
Sept. 24, 1884	12 09	77 24 E.	2 39 W.
Jan. 24, 1884	12 15	80 13 W.	10 12 E.

a=Mean of observations on 32 equidistant points.

From 10° South to 15° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Iroquois	Lt. F. W. Crocker	Lt. Scott.
" Pensacola	" F. Hanford	" Diehl.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Essex	" W. H. Parker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Wachusett	" B. S. Richards	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" **Pensacola**	" **F. Hanford**	" **F. Hanford.**
" Essex	" W. H. Parker	" Scott.
" Essex	" W. H. Parker	" Scott.
" Essex	" W. H. Parker	" Scott.
" Lackawa'na	" J. M. Miller	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 2, 1884	**12° 18′**	**56° 22′ E.**	**7 02 W.** *a*
Oct. 1, 1884	12 21	59 04 E.	5 37 W.
April 21, 1882	12 30	27 21 W.	15 42 W.
April 25, 1884	12 50	11 37 W.	21 19 W.
July 22, 1883	**12 58**	**38 30 W.**	**10 37 W.** *c*
July 25, 1883	13 00	37 04 W.	10 08 W.
June 30, 1883	**13 10**	**48 25 E.**	**9 47 W.** *b*
Sept. 21, 1884	13 13	169 27 W.	9 20 E.
Feb. 25, 1883	**13 18**	**33 15 W.**	**13 51 W.** *b*
June 29, 1883	**13 26**	**48 18 E.**	**10 10 W.** *b*
Oct. 6, 1884	13 30	46 15 E.	9 23 W.
April 24, 1882	13 35	30 18 W.	15 42 W.
Dec. 1, 1883	13 40	76 59 W.	9 30 E.
Sept. 20, 1884	13 50	167 33 W.	8 37 E.
Sept. 19, 1884	14 00	166 39 W.	8 36 E.
Nov. 23, 1884	14 04	9 21 W.	22 41 W.
Sept. 18, 1884	14 07	165 42 W.	8 46 E.
Oct. 7, 1884	**14 08**	**42 23 E.**	**12 26 W.** *a*
March 25, 1884	14 22	8 37 W.	24 19 W.
Dec. 30, 1883	14 25	91 03 E.	1 20 W.
Jan. 21, 1884	14 27	79 50 W.	10 23 E.
Sept. 17, 1884	14 31	163 31 W.	8 14 E.
Nov. 23, 1884	14 33	8 36 W.	22 57 W.

a = Mean of observations on 8 equidistant points.

b = " " " 16 " "

c = Mean of 22 observations taken on shore and at anchor.

From 10° South to 15° South.

(4) Name of ship.	(5) Name of observer.	(6) Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. W. H. Parker.
" Essex	" W. H. Parker	" Scott.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. Kellogg	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Enterprise	" G. A. Norris	" G. A. Norris.
" Iroquois	" F. W. Crocker	" Scott.
" Enterprise	" G. A. Norris	" G. A. Norris.
" Enterprise	" G. A. Norris	" G. A. Norris.
" Essex	" W. Kellogg	" Scott.
" Essex	" W. H. Parker	" Hubbard.
" Wachusett	" B. S. Richards	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Essex	" W. Kellogg	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Essex	" W. H. Parker	" W. H. Parker.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Lackawa'na	" J. M. Miller	" Diehl.
" Iroquois	" F. W. Crocker	" Scott.
" Essex	" W. Kellogg	" Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Feb. 26, 1883	**14° 40′**	**33° 43′ W.**	**13° 08′ W.** *a*
Sept. 15, 1884	14 44	160 10 W.	7 21 E.
Dec. 31, 1883	14 45	88 21 E.	2 44 W.
Jan. 1, 1884	14 49	85 30 E.	2 58 W.
July 19, 1883	14 55	38 00 W.	9 55 W.
Jan. 3, 1884	14 55	81 26 E.	3 31 W.
Jan. 4, 1884	14 57	78 54 E.	4 01 W.

a=Mean of observations on 16 equidistant points.

From 10° South to 15° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Enterprise	Lt. G. A. Norris	Lt. G. A. Norris.
" Iroquois	" F. W. Crocker	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 25, 1884	15° 00′	40° 55′ E.	12° 04′ W.
Sept. 14, 1884	15 03	158 11 W.	8 19 E.
Jan. 5, 1884	15 04	76 52 E.	4 35 W.
March 24, 1884	15 06	6 58 W.	24 35 W.
April 25, 1883	15 10	76 28 W.	10 00 E.
Jan 7, 1884	15 12	73 14 E.	4 51 W.
Jan. 8, 1884	15 23	71 19 E.	5 37 W.
Feb. 27, 1883	15 28	33 52 W.	12 19 W.
Oct. 16, 1882	15 34	75 45 W.	11 27 E.
Sept. 12, 1884	15 35	153 35 W.	8 47 E.
Jan. 9, 1884	15 39	69 10 E.	5 44 W.
Oct. 2, 1884	15 42	172 20 W.	8 35 E.
Jan. 20, 1884	15 43	79 22 W.	11 52 E.
Feb. 27, 1884	15 43	74 36 W.	11 41 E.
Sept. 1, 1884	15 50	147 35 W.	8 13 E.
May 6, 1884	**15 51**	**5 53 W.**	**24 49 W.** *a*
Nov. 30, 1883	16 06	76 43 W.	10 03 E.
May 6, 1884	**16 08**	**6 16 W.**	**24 18 W.** *a*
Oct. 3, 1884	16 13	175 09 W.	8 26 E.
Jan. 11, 1884	16 17	64 19 E.	6 51 W.
April 23, 1884	16 20	5 20 W.	25 55 W.
Feb. 28, 1883	16 22	33 41 W.	13 16 W.
Oct. 25, 1884	16 30	40 20 E.	13 53 W.

a = Mean of observations on 32 equidistant points.

From 15° South to 20° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. Kellogg	Lt. Scott.
" Iroquois	" F. W. Crocker	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Iroquois	" F. W. Crocker	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Iroquois	" F. W. Crocker	" Scott.
" Lackawa'na	" J. M. Miller	" Diehl.
" Wachusett	" B. S. Richards	" Scott.
" Iroquois	" F. W. Crocker	" Scott.
" **Brooklyn**	" **E. W. Watson**	" **Diehl.**
" Wachusett	" B. S. Richards	" Scott.
" **Brooklyn**	" **E. W. Watson**	" **Diehl.**
" Iroquois	" F. W. Crocker	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Essex	" W. Kellogg	" Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 15, 1882	16° 43′	74° 09′ W.	10° 58′ E.
Feb. 28, 1884	16 44	72 39 W.	12 06 E.
July 18, 1883	16 47	38 09 W.	10 48 W.
May 9, 1884	16 58	8 54 W.	24 25 W.
Jan. 12, 1884	17 02	61 56 E.	7 15 W.
March 20, 1884	17 02	4 21 W.	24 55 W.
April 23, 1883	17 06	74 02 W.	10 43 E.
Nov. 19, 1884	**17 15**	**4 02 W.**	**24 30 W.** *a*
Oct. 26, 1884	17 33	39 33 E.	14 12 W.
Jan. 16, 1884	17 33	53 48 E.	10 06 W.
Jan. 15, 1884	17 35	56 00 E.	9 48 W.
Jan. 13, 1884	17 37	59 47 E.	8 15 W.
Jan. 14, 1884	17 41	57 57 E.	8 44 W.
March 1, 1883	17 42	33 21 W.	13 34 W.
Oct. 14, 1882	17 43	72 26 W.	11 07 E.
May 11, 1884	17 46	11 35 W.	24 14 W.
Feb. 29, 1884	17 48	71 19 W.	12 05 E.
Aug. 15, 1883	17 49	78 18 W.	11 05 E.
Jan. 18, 1884	18 01	49 44 E.	11 57 W.
Oct. 13, 1882	18 14	71 10 W.	9 17 E.
Nov. 29, 1883	18 17	76 05 W.	11 18 E.
March 19, 1884	18 34	2 24 W.	25 31 W.
May 12, 1884	18 37	13 28 W.	23 29 W.

a = Mean of observations on 8 equidistant points.

From 15° South to 20° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. Hubbard.
" Wachusett	" B. S. Richards	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. Kellogg	" W. Kellogg.
" Essex	" W. Kellogg	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Brooklyn	" E. W. Watson	" Diehl.
" Wachusett	" B. S. Richards	" Scott.
" Wachusett	" B. S. Richards	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Wachusett	" B. S. Richards	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 17, 1883	18° 42′	38° 28′ W.	11° 34′ W.
Sept. 24, 1883	18 44	70 38 W.	10 23 E.
March 2, 1883	19 06	32 34 W.	13 10 W.
Feb. 7, 1884	19 11	43 03 E.	14 59 W.
July 17, 1883	19 15	38 32 W.	9 55 W.
Nov. 18, 1884	19 20	1 27 W.	25 02 W.
Nov. 28, 1883	19 30	75 49 W.	11 15 E.
May 13, 1884	19 31	15 21 W.	22 41 W.
Oct. 12, 1884	19 41	176 53 E.	9 44 E.
March 18, 1884	19 51	0 44 W.	26 13 W.
March 3, 1883	19 54	32 02 W.	13 12 W.
Oct. 7, 1882	19 56	70 26 W.	12 59 E.

From 15° South to 20° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Galena	Lt. H. W. Lyon	Lt. Diehl.
" Lackawa'na	" J. W. Carlin	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Brooklyn	" E. W. Watson	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Wachusett	" B. S. Richards	" Scott.
" Brooklyn	" E. W. Watson	" Diehl.
" Iroquois	" F. W. Crocker	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
July 16, 1883	20° 08′	39° 05′ W.	9° 25′ W.
Jan. 16, 1884	20 17	77 40 W.	14 07 E.
July 16, 1883	20 20	39 13 W.	9 37 W:
June 17, 1883	**20 21**	**44 07 E.**	**15 52 W.** *a*
Nov. 27, 1883	20 39	75 29 W.	11 12 E.
May 15, 1884	20 47	18 03 W.	22 27 W.
Oct. 14, 1884	20 57	174 17 E.	10 15 E.
March 4, 1883	21 06	31 06 W.	13 21 W.
May 16, 1884	21 09	18 58 W.	21 58 W.
Jan. 15, 1884	21 20	77 00 W.	14 11 E.
June 16, 1883	21 29	43 03 E.	17 07 W.
Oct. 3, 1882	21 32	70 47 W.	12 56 E.
July 15, 1883	21 34	39 52 W.	8 24 W.
May 17, 1884	21 35	20 00 W.	21 46 W.
Nov. 17, 1884	21 43	1 29 E.	25 34 W.
Nov. 26, 1883	21 56	75 01 W.	11 13 E.
March 5, 1883	22 25	29 49 W.	11 25 W.
July 14, 1883	22 34	40 45 W.	6 53 W.
May 18, 1884	22 35	22 14 W.	20 33 W.
Sept. 28, 1883	22 44	70 59 W.	10 55 E.
March 15, 1884	22 49	2 49 E.	27 10 W.
Aug. 13, 1883	22 50	78 56 W.	12 43 E.
July 14, 1883	22 54	41 26 W.	6 51 W.

a = Mean of observations on 16 equidistant points.

From 20° South to 25° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Galena	Lt. H. W. Lyon	Lt. Diehl.
" Lackawa'na	" J. M. Miller	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" **Enterprise**	" **G. A. Norris**	" **G. A. Norris.**
" Wachusett	" B. S. Richards	" Scott.
" Brooklyn	" E. W. Watson	" Diehl.
" Iroquois	" F. W. Crocker	" Scott.
" Enterprise	" G. A. Norris	" Hubbard.
" Brooklyn	" E. W. Watson	" Diehl.
" Lackawa'na	" J. M. Miller	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Galena	" H. W. Lyon	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Wachusett	" B. S. Richards	" Scott.
" Enterprise	" G. A. Norris	" Hubbard.
" Galena	" H. W. Lyon	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Lackawa'na	" J. W. Carlin	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Wachusett	" B. S. Richards	" Scott.
" Galena	" H. W. Lyon	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 18, 1884	22° 58′	23° 03′ W.	19° 41′ W.
April 29, 1882	23 10	39 08 W.	7 47 W.
June 15, 1883	**23 19**	**43 32 E.**	**17 43 W.** *a*
Nov. 25, 1883	23 36	74 38 W.	12 49 E.
April 15, 1883	23 37	70 57 W.	11 28 E.
July 13, 1883	23 47	42 37 W.	6 44 W.
Nov. 16, 1884	23 47	4 48 E.	25 45 W.
March 5, 1884	23 52	42 38 E.	19 14 W.
Jan. 13, 1884	24 05	75 45 W.	14 14 E.
July 13, 1883	24 24	43 08 W.	5 50 W.
Nov. 2, 1884	24 25	45 17 W.	2 56 W.
March 7, 1883	24 35	28 20 W.	16 35 W.
May 24, 1884	24 45	30 48 W.	14 26 W.
March 7, 1883	24 54	28 18 W.	16 02 W.
Aug. 11, 1883	24 55	79 07 W.	14 06 E.

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a = Mean of observations on 16 equidistant points.

From 20° South to 25° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Brooklyn	Lt. E. W. Watson	Lt. Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Enterprise	" G. A. Norris	" G. A. Norris.
" Wachusett	" B. S. Richards	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Brooklyn	" E. W. Watson	" Diehl.
" Lackawa'na	" J. M. Miller	" Diehl.
" Galena	" H. W. Lyon	" Diehl,
" Nipsic	" C. H. Arnold	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Brooklyn	" E. W. Watson	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Wachusett	" B. S. Richards	" Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Nov. 24, 1883	25° 00′	74° 14′ W.	12° 50′ E.
Oct. 29, 1884	25 00	36 16 E.	18 53 W.
March 8, 1883	25 27	28 10 W.	15 34 W.
March 12, 1884	25 32	6 54 E.	28 03 W.
May 24, 1884	25 55	31 17 W.	14 20 W.
July 11, 1883	26 00	43 27 W.	4 28 W.
March 25, 1884	26 02	32 18 W.	13 43 W.
Nov. 15, 1884	26 05	7 10 E.	25 53 W.
May 26, 1884	26 06	32 53 W.	12 33 W.
Feb. 1, 1884	26 11	48 55 E.	18 40 W.
May 27, 1884	26 23	34 09 W.	11 48 W.
March 9, 1883	26 31	27 42 W.	15 26 W.
July 11, 1883	26 40	43 56 W.	4 45 W.
April 16, 1884	27 16	10 16 E.	27 53 W.
May 28, 1884	27 16	36 11 W.	10 51 W.
Nov. 14, 1884	27 18	8 49 E.	26 00 W.
March 10, 1884	27 20	71 08 W.	14 10 E.
Oct. 30, 1884	27 25	35 56 E.	20 31 W.
March 11, 1884	27 30	9 20 E.	28 21 W.
Nov. 15, 1884	27 44	48 12 W.	1 18 W.
July 10, 1883	27 51	45 02 W.	3 36 W.
Nov. 14, 1884	27 51	9 38 E.	26 11 W.
Nov. 23, 1883	28 03	73 33 W.	13 53 E.

From 25° South to 30° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Wachusett	Lt. B. S. Richards	Lt. Scott.
" Essex	" W. Kellogg	" Scott.
" Enterprise	" G. A. Norris	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Brooklyn	" E. W. Watson	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Enterprise	" G. A. Norris	" Hubbard.
" Galena	" H. W. Lyon	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Wachusett	" B. S. Richards	" Scott.
" Essex	" W. Kellogg	" Scott.
" Pensacola	" F. Hanford	" Diehl.
" Nipsic	" C. H. Arnold	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Wachusett	" B. S. Richards	" Scott.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
May 5, 1882	28° 13′	43° 19′ W.	1° 53′ W.
Sept. 29, 1882	28 15	72 41 W.	14 15 E.
Oct. 2, 1883	28 19	71 49 W.	13 16 E.
Feb. 4, 1884	28 19	40 23 E.	22 07 W.
Oct. 30, 1884	28 19	33 14 E.	21 26 W.
March 10, 1883	28 25	27 26 W.	15 41 W.
Feb. 5, 1884	28 29	39 16 E.	24 56 W.
July 10, 1883	28 34	45 40 W.	1 45 W.
Feb. 6, 1884	28 42	37 45 E.	24 15 W.
May 30, 1884	28 46	39 44 W.	7 30 W.
April 15, 1884	28 49	10 31 E.	28 24 W.
March 10, 1883	**28 51**	**27 27 W.**	**15 24 W.** *a*
March 10, 1884	28 57	11 19 E	28 26 W.
May 30, 1884	29 10	40 41 W.	5 29 W.
Nov. 13, 1884	29 37	11 59 E.	26 19 W.
April 11, 1883	**29 56**	**71 19 W.**	**13 42 E.** *b*

a = Mean of observations on 16 equidistant points.

b = " " " " 8 " "

From 25° South to 30° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Essex	Lt. W. H. Parker	Lt. Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Lackawa'na	" J. W. Carlin	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Enterprise	" G. A. Norris	" Hubbard.
" Pensacola	" F. Hanford	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Enterprise	" G. A. Norris	" G. A. Norris.
" Pensacola	" F. Hanford	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Essex	" W. Kellogg	" Scott.
" Pensacola	" F. Hanford	" F. Hanford.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Nov. 16, 1884	30° 00′	48° 42′ W.	0° 12′ W.
July 9, 1883	30 06	47 02 W.	0 02 W.
May 31, 1884	30 13	42 54 W.	4 03 W.
March 12, 1883	**30 18**	**26 48 W.**	**14 51 W.** *a*
March 12, 1883	**30 23**	**25 58 W.**	**16 00 W.** *a*
Oct. 2, 1883	30 29	72 04 W.	14 22 E.
July 9, 1883	30 30	47 45 W.	1 25 E.
March 9, 1884	30 31	13 10 E.	28 52 W.
Nov. 22, 1883	30 33	72 46 W.	15 40 E.
May 31, 1884	30 38	43 50 W.	2 15 W.
April 14, 1884	30 42	12 54 E.	28 39 W.
Nov. 16, 1884	30 45	49 08 W.	0 59 W.
March 17, 1883	30 46	12 56 W.	25 53 W.
March 16, 1883	30 58	17 38 W.	23 24 W.
May 9, 1882	31 12	46 07 W.	0 10 E.
Oct 31, 1884	31 13	30 50 E.	25 48 W.
March 20, 1883	31 39	11 10 W.	24 15 W.
July 8, 1883	31 54	48 30 W.	1 44 E.
March 8, 1884	32 10	15 24 E.	28 59 W.
March 24, 1883	**32 24**	**1 11 W.**	**27 21 W.** *a*
March 23, 1883	**32 26**	**3 17 W.**	**26 37 W.** *b*
Oct. 21, 1883	32 34	12 03 W.	24 11 W.
April 13, 1884	32 41	16 01 E.	29 09 W.

a = Mean of observations on 16 equidistant points.

b = " " " " 4 " "

From 30° South to 35° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Nipsic	Lt. C. H. Arnold	Lt. Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" **Enterprise**	" **G. A. Norris**	" **G. A. Norris.**
" **Enterprise**	" **G. A. Norris**	" **G. A. Norris.**
" Lackawa'na	" J. W. Carlin	" Diehl.
" Galena	" H. W. Lyon	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" Wachusett	" B. S. Richards	" Scott.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Nipsic	" C. H. Arnold	" Scott.
" Enterprise	" G. A. Norris	" Hubbard.
" Enterprise	" G. A. Norris	" Hubbard.
" Essex	" W. H Parker	" Hubbard.
" Essex	" W. Kellogg	" Scott.
" Enterprise	" G. A. Norris	" Hubbard.
" Galena	" H. W. Lyon	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" **Enterprise**	" **G. A. Norris**	" **G. A. Norris.**
" **Enterprise**	" **G. A. Norris**	" **G. A. Norris.**
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Oct. 22, 1883	32° 46′	8° 44′ W.	24° 44′ W.
Nov. 1, 1884	32 52	29 14 E.	28 19 W.
March 10, 1884	32 58	28 36 E.	29 14 W.
Nov. 11, 1884	**33 00**	**17 14 E.**	**28 37 W.** *a*
Nov. 20, 1883	**33 01**	**71 38 W.**	**15 07 E.** *a*
Dec. 18, 1883	**33 01**	**71 37 W.**	**15 41 E.** *b*
Oct. 23, 1883	33 05	7 05 W.	25 49 W.
May 12, 1882	33 25	49 14 W.	5 54 E.
March 7, 1884	**33 40**	**17 39 E.**	**30 00 W.** *c*
Nov. 18, 1884	33 40	52 16 W.	3 52 E.
Oct. 19, 1883	33 42	14 10 W.	22 14 W.
July 21, 1882	33 48	73 20 W.	18 04 E.
May 13, 1882	33 58	50 27 W.	4 37 E.
Nov. 19, 1884	34 00	52 03 W.	4 26 E.
July 7, 1883	34 00	51 00 W.	3 59 E.
March 28, 1883	**34 03**	**13 40 E.**	**29 06 W.** *c*
Oct. 24, 1883	34 24	3 34 W.	26 17 W.
Feb. 17, 1884	34 31	24 24 E.	28 36 W.
Dec. 22, 1882	**34 58**	**56 15 W.**	**7 54 E.** *d*

a = Mean of observations on 8 equidistant points.
b = " " " " 32 " "
c = " " " " 16 " "
d = Mean of four sets with observations on 32, 24, 16 and 32 equidistant points respectively.

From 30° South to 35° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Brooklyn	Lt. E. W. Watson	Lt. Diehl.
" Essex	" W. Kellogg	" Scott.
" Brooklyn	" E. W. Watson	" Diehl.
" **Essex**	" **W. Kellogg**	" **Scott.**
" **Wachusett**	" **B. S. Richards**	" **Hubbard.**
" **Lackaw'na**	" **J. W. Carlin**	" **J. W. Carlin.**
" Brooklyn	" E. W. Watson	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" **Pensacola**	" **F. Hanford**	" **F. Hanford.**
" Nipsic	" C. H. Arnold	" Scott.
" Brooklyn	" E. W. Watson	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Essex	" W. H. Parker	" Hubbard.
" Nipsic	" C. H. Arnold	" Scott.
" Galena	" H. W. Lyon	" Diehl.
" **Enterprise**	" **G. A. Norris**	" **G. A. Norris.**
" Brooklyn	" E. W. Watson	" Diehl.
" Pensacola	" F. Hanford	" Diehl.
" **Galena**	" **H. W. Lyon**	" **H. W. Lyon.**

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
June 5, 1884	**35° 00′**	**55° 47′ W.**	**7° 48′ E.** *a*
March 7, 1883	**35 04**	**56 07 W.**	**7 58 E.** *b*
Dec. 19, 1884	**35 07**	**56 10 W.**	**7 56 E.** *c*
July 20, 1882	35 07	75 08 W.	22 03 E.
Oct. 25, 1883	**35 10**	**56 40 W.**	**8 34 E.** *d*
Oct. 31, 1883	35 15	7 04 E.	29 22 W.
Nov. 20, 1883	35 15	19 30 E.	30 26 W.
Jan. 15, 1885	**36 24**	**175 19 E.**	**13 42 E.** *e*
Oct 15, 1883	36 40	20 47 W.	17 35 W.
Jan. 4, 1883	36 42	55 08 W.	8 38 E.
June 11, 1882	37 07	55 19 W.	7 47 E.
Oct. 6, 1883	37 19	37 27 W.	5 14 W.
Dec. 22, 1882	37 39	55 12 W.	8 31 E.
Feb. 1, 1883	37 39	55 40 W.	9 21 E.
Oct. 14, 1883	37 42	22 44 W.	15 35 W.
Nov. 27, 1883	38 05	42 36 E.	28 35 W.
Oct. 3, 1883	38 10	45 44 W.	3 04 E.
Oct. 2, 1883	38 20	48 21 W.	4 42 E.
Jan. 5, 1883	38 41	56 09 W.	10 04 E.
Feb. 1, 1883	38 45	56 44 W.	9 21 E.
Dec. 21, 1882	39 37	57 24 W.	10 22 E.

a = Mean of observations on 8 equidistant points.
b = Mean of four sets of observations on 32 equidistant points.
c = Mean of observations on 16 equidistant points.
d = Mean of two sets with observations on 16 and 32 equidistant points; starboard and port helm.
e = Mean of observations on 24 equidistant points.

From 35° South to 40° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Brooklyn	Lt. E. W. Watson	Lt. E. W. Watson.
" Brooklyn	" E. W. Watson	" E. W. Watson.
" Nipsic	" C. H. Arnold	" C. H. Arnold.
" Essex	" W. H. Parker	" Hubbard.
" Nipsic	" C. H. Arnold	" C. H. Arnold.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Iroquois	" F. W. Crocker	" F. W. Crocker.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Jan. 6, 1883	40° 58′	58° 22′ W.	11° 31′ E.
Jan. 31, 1883	41 30	59 07 W.	12 58 E.
Dec. 20, 1882	42 06	59 13 W.	12 51 E.
June 16, 1882	42 36	60 30 W.	12 18 E.
Jan. 7, 1883	44 39	61 07 W.	13 38 E.

From 40° South to 45° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Brooklyn	Lt. E. W. Watson	Lt. Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Brooklyn	" E. W. Watson	" Diehl.

South Latitude.

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Dec. 19, 1882	45° 11′	61° 39′ W.	14° 35′ E.
Oct. 30, 1882	45 50	62 25 W.	14 52 E.
June 18, 1882	46 03	62 39 W.	15 19 E.
Dec. 18, 1882	46 16	62 52 W.	15 17 E.
June 18, 1882	**46 46**	**62 48 W.**	**16 13 E.** *a*
Oct. 31, 1882	46 51	63 08 W.	15 56 E.
Dec. 17, 1882	47 56	64 55 W.	16 56 E.
Jan. 28, 1882	48 51	65 31 W.	17 12 E.

a=Mean of observations on 12 equidistant points.

From 45° South to 50° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Brooklyn	Lt. E. W. Watson	Lt. Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Essex	" W. H. Parker	" Hubbard.
" Brooklyn	" E. W. Watson	" Diehl.
" Essex	" W. H. Parker	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.
" Brooklyn	" E. W. Watson	" Diehl.

South Latitude:

(1)	(2)		(3)
Date of observation.	Place of observation.		Variation.
	Latitude.	Longitude.	
Nov. 21, 1882	**50° 07′**	**68° 26′ W.**	**18° 56′ E.** *a*
March 10, 1884	**51 50**	**71 06 W.**	**21 26 E.** *b*

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a = Mean of observations on 32 equidistant points.

b = " " " " 16 " "

From 50° South to 55° South.

(4)	(5)	(6)
Name of ship.	Name of observer.	Computed by—
U. S. S. Brooklyn	Lt. E. W. Watson	Lt. E. W. Watson.
" Pinta	" H. T. Monohan	" H. T. Monohan.

UNIV. OF MICHIGAN
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Washington, September 14, 1884.

INSTRUCTIONS RELATIVE TO THIS COMPASS REPORT.

FOR IRON AND STEEL VESSELS.

I. When a vessel of this class is newly commissioned and ready for sea, chorus

(9)

Variations.
(leave blank.)

or heeled;
if latter, state
the angle
and to
which side.

Give an account here of any extensive repairs to machinery or hull since last report—such repairs as would be likely to change the magnetic also of any mass of iron or steel not usually carried by vessels of the Navy.